The Great Ideas of Psychology

Part I

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Dr. Robinson's books include *The Enlightened Machine: An Analytical Introduction to Neuropsychology* (Columbia, 1980), *Psychology and Law* (Oxford, 1980), *Philosophy of Psychology* (Columbia, 1985), *Aristotle's Psychology* (1989), *An Intellectual History of Psychology* (3rd ed., Wisconsin, 1995) and *Wild Beasts & Idle Humours: The Insanity Defense from Antiquity to the Present* (Harvard, 1996). Dr. Robinson has served as principal consultant to the Public Broadcasting System for the award-winning series "The Brain" and the subsequent nine-part series, "The Mind." He is past president of two divisions of the American Psychological Association: the division of the history of psychology and the division of theoretical and philosophical psychology. He is fellow of the American Psychological Association and of the British Psychological Society. Dr. Robinson is also visiting senior member of Linacre College, Oxford.

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The Great Ideas of Psychology

Scope

These forty-eight lectures examine the conceptual and historical foundations, the methods, the major findings, and the dominant perspectives in psychology. The subject is vast. The lectures are designed to achieve balance between basic processes and real-life issues; between the "hard science" and "soft science" of psychology; between the personal and the social; between the normal and the deviant.

In addition to a critical review of major findings and theories, the lectures examine several controversial issues arising from or illuminated by psychological research and theory. Included among these are the issue of "nature" versus "nurture"; theories of genetic or behavioristic or biological determinism; theories of moral relativism and absolutism; sex "roles" and gender stereotyping; the place of psychology within the legal system (e.g., in predicting violence, establishing competence, or determining whether or not a defendant is sane).

Although psychology and kindred disciplines help to clarify such issues, the lectures will point to the limitations imposed on any purely scientific or empirical approach to matters of this sort.

Objectives

The student will be able to:

1. Identify the broad historical and conceptual foundations of psychology from its origins in classical philosophy to the present;
2. Identify the major research methods and findings that characterize contemporary psychology;
3. Explain the principal claims and the main points of contention between and among the major schools and systems of psychology, including the behavioristic, the psychoanalytic, the neurocognitive, and social constructionist;
4. Explain the dependence of these issues on the larger framework bequeathed by the history of ideas.

Section One: Foundations

Lecture One

Defining the Subject

Scope: It is customary to define psychology as a "behavioral science" or, following William James, as a "science of the mind." What is left unexamined in such statements is the model of science presupposed in such definitions.

One influential model of science requires that any candidate-science be able to explain events by subsuming them under general laws; e.g., the law of universal gravitation "explains" why objects fall toward the center of the earth. But very few psychological events have ever been subsumed under reliable general laws. Moreover, some have argued that any event that can be thus subsumed is, by that fact, not a social or psychological event at all! Thus does controversy abound even at the outset.

Objectives: Upon completion of this lecture you should be able to:

1. Explain why there is no settled position on just what is or is not a fit subject for "science," or whether psychology is a science "through-and-through."
2. Explain the "nomological-deductive" model of science and give an illustration of it.
3. Give two or three examples of events that are not "explained" in terms of causes but only in terms of the actor's reasons for acting.

Outline

I. Psychology as an independent science

  A. Psychology cannot be understood as a "science" because it employs the scientific method. It is not at all clear what the scientific method entails.

  B. Alternatively, science can be understood as a particular mode of explanation, as opposed to a particular method.

    1. Hempel's nomological-deductive model posits that an explanation is scientific if it makes reference to a universal law know to be true, and if the event being explained is an instant case of the universal law. The explanation then is simply a deduction from the universal law.
    2. Hempel's model of science is too strong for psychology. There are no universal psychological laws known to be true. Thus Hempel offers the explanation sketch as an alternative. Although explanation sketches are not "full-fledged," they can provide good explanations where the universal from which the explanation is derived is relatively probable although not known.
    3. Under the Hempelian model, because Newtonian mechanics was replaced by relativity theory, Newtonian physics is not science at all, which is undeniably an absurd claim. Although relativity theory revealed Newton's limitations, the Newtonian model is still powerful within a specific context.
    4. A general law is true when it has not been falsified by any previous trials. What other standard could there be?
    5. In areas of psychology, such as sensory psychology, there are relatively good general laws, but these are the least interesting areas. In attempting to understand human beings, however, psychology would scarcely fit into the Hempelian model of science.

II. The humanistic tradition questions whether or not psychology should be molded into a "science" at all. The humanists see the most important aspects of human psychology as precisely those unique factors which make us human.

  A. An event is "psychological" to the extent that it results from human goals, desires, or aspirations.

  B. The participants in psychological events are unique. Thus the event is not reducible to general laws. The ontology of psychology is not one which lends itself to scientific explanation.

III. The nomological-deductive model of science is not tantamount to determinism. While events are often entirely predictable, they are not necessarily determined.

Essential Reading:

Gleitman, pp. 1-6

Robinson, pp. 3-13

Supplementary Reading:

Hempel, C. *Aspects of Scientific Explanation*. New York: Free Press, 1965.

Dray, W. *Laws and Explanation in History*. New York: Oxford University Press, 1957.

Robinson, D. *Philosophy of Psychology*. New York: Columbia University Press, 1985.

Questions to Consider:

1. Estimate whether the disciplines of sociology and history can be fit into a nomological-deductive framework.
2. Explain whether psychological modes of explanation can be regarded as scientific, in any meaningful sense, if they do not take the form of universal laws?

Lecture Two
Ancient Foundations: Greek Philosophers and Physicians

Scope: Preclassical Greece was the first society in which people externalized their thoughts and feelings and undertook to examine them in objective terms. This is evident as early as the epic poems of Homer.

With Plato and especially with Aristotle, a philosophical psychology began to be developed along lines that continue to identify the boundaries of the subject and its central issues. In wrestling with the problem of knowledge, the nature of good and evil, theories of governance, and the root question—the sort of life that is right for man—the ancient philosophers laid the foundations for the discipline of psychology.

Objectives: Upon completion of this lecture, you should be able to:

1. Identify in Homer's explanations the anticipation of philosophical approaches to self-understanding.
2. Outline how Plato's psychology should be recognized as a "nativistic" and rationalistic psychology leading to certain conclusions about the right form of life and of government.
3. Summarize how Aristotle's *Psychology* should be understood as broadly ethological, naturalistic, even biological, but also relying on moral and political psychology as necessary for a fully systematic science of human nature.

Outline

I. The ancient Greek world offers the earliest evidence of a people subjecting its deepest thoughts and sentiments to critical evaluation. The famous inscription at the Temple of Delphi, "Know thyself," is exemplary of this aspect of Greek though.

II. The ancient Greeks owe their greatest debt to Homer. *The Iliad* and *The Odyssey* conditioned the ancient mind to think in a particular sort of way. The Homeric conception of the soul is fraught with how reason plagued by anger results in nothing less than tragedy.

- **A.** The first words of the *Iliad* are "noble fury" (*menos*). Character and how one should act are central themes in Homeric epic poetry.
- **B.** The ancient Greek gods were immortal but not omniscient. None of the gods know the future for certain. Thus in early Greek theology, there is no definitive scriptural answer. How one should act was as much a subject for philosophy as it was for theology.
- **C.** Homer offers broadly psychological explanations of human behavior. Much of Homeric psychology is mechanistic, making reference to physiological characteristics of the body.

III. Socrates begins systematic inquiry into the human condition from an anthropocentric perspective. This voice of Socrates is brought down through the dialogues of Plato.

- **A.** Socratic philosophy owes a large debt to Pythagoras.
  1. The Pythagorean perspective takes eternal truths to be held relationally. These relations were primarily understood mathematically and harmonically. It is said that the Pythagoreans believed that the entire universe could be constructed from the first four positive integers.
  2. The Socratics do not look for philosophical truths in the physical world, but in what is immutable and eternal. Thus there is a certain skepticism about perception. The business of philosophy is to find that which transcends time and culture. Philosophical truths will ultimately be "true forms."
  3. Where does one begin such a search for truth? In *The Meno*, Plato provides the answer to this question. Philosophical truths are in the soul, and one must be guided to them. These truths are masked because of the fallibility of perception.
- **B.** Platonic psychology is not empirical, nor does it rely on popular opinion for the answers to significant questions. The philosopher-king leads the citizens through questions of philosophical significance.

C. Plato believed that the soul had certain endowments which make humans fit for particular activities. In significant respects, these native characteristics, illustrated through the metaphor of men of gold, silver, brass, and iron in *The Republic*, cannot be changed by learning or experience.

IV. Aristotle, who studied under Plato in The Academy for twenty years, adopted a quite naturalistic, observational approach to psychology.

A. By the soul, he refers to the processes by which a living thing actually lives. In the opening lines of *The Metaphysics*, he rejects Plato's skepticism of perception.

B. There is something more than perception in humans. There is a rational faculty, which although natural must be understood in a wholly different light.

V. Hippocratic medicine was highly observation in its approach. The Hippocratics were not "witch doctors" but diligent, practical experimentalists.

Essential Reading:

Robinson, Ch. 2

Supplementary Reading:

Barnes, J. *Early Greek Philosophy*. London: Penguin, 1987.

Bremer, Jan. *The Early Greek Concept of the Soul*. Princeton: Princeton University Press, 1983.

Robinson, D.N. *Aristotle's Psychology*. New York: Columbia University Press, 1989.

Plato, *The Dialogues* (in many editions)

Questions to Consider:

1. Summarize what alternative explanation(s) can be given for Meno's slave's apparent recollection of the Pythagorean theorem.
2. Identify what facets of human psychology can be explained by a naturalistic, observational approach.

Lecture Three
Minds Possessed: Witchery and the Search for Explanations

Scope: "Folk" psychology has always reserved a special place for those judged to be abnormal or insane or "possessed." Ordinary behavior and perception, of the sort shared by nearly all members of the community, will call for no special understanding or explanation. Bizarre conduct, however is a different matter.

Western law, as early as ancient Greek and Roman times, makes provision for the insane, the incompetent, and the mentally defective. Penalties were also assessed against the "witch," but only one who did actual injury. With the advent of developed theological theories of witchcraft, however, trials and executions between 1400 and 1700 reached the tens of thousands. These trials were built upon psychological perspectives and "data" now understood to be as bizarre as witchcraft itself. Increasingly, the leaders of thought pressed on toward ever more scientific and ever less "metaphysical" modes of explanation.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain how developed law, since ancient times, has respected the special vulnerabilities of the mentally disturbed.
2. Identify the interplay of social, religious, scientific and political forces in declaring certain persons to be identified as "troubled" and troubling.
3. Explain how the witch trials actually *did* rely on evidence, including physical evidence, and sought to provide a path to "salvation," i.e., that much in the enterprise was motivated by the desire to serve the defendant's best interests.

Outline

I. There is no time in recorded history that does not have some understanding of witches. The ancient understanding of witchcraft distinguished between "white" and "black" witches. This distinction was important, because the law virtually ignored those who were engaged in "white" magic.

II. The Christian era brought about a change in this understanding of witches.

   A. Christianity placed great stress upon individual accountability and relative moral freedom. If the devil made the witch do it, the act is not sinful, because the act is not intended, nor is it something that the actor could forbear from doing.

   B. Witchcraft was understood as something non-natural—as something supernatural. There are only two sources of the supernatural: the evil and the divine.

   C. The witch theory was therefore formulated as the witch willingly entering into a implicit pact with the devil (*pactum implicitum*).

III. There were several safeguards against the categorical prosecution of those accused of witchery, but these limitations were not consistently followed. Although there were attempts to establish "scientific" tests for establishing guilt, such tests were certainly unfair assessments of witchery.

   A. There was no possibility of a countersuit against an accuser if the charges were false. The accuser remained anonymous; thus there was no bulwark against unjust accusations.

   B. The charge of witchcraft was viewed as a species of heresy. This was taken to be a grave offense, although the ecclesiastical procedures were more just.

   C. The flotation test was used to determine if one was a witch. The accused would be suspended in a pool and then released. If she floated, she was presumed to be a witch.

   D. In the tear test, a person would stand before the accused reading an official text about the sacrifice of Jesus. At the end of the reading, if the witch could not form tears, the presumption was that she was a witch.

   E. It was also thought that the devil had to mark the body by creating an insensitive spot upon it. The job of "witch prickers" was to search for these spots.

F. The *Malleus Maleficarum* was the definitive resource on diagnosing witchcraft. Doctors and priests were routinely called upon for what at the time was equivalent to "expert testimony."

IV. By the sixteenth century, various thinkers began to come forward with challenges to the traditional notions of and procedures for determining witchcraft.

A. Johann Weyer's *De Prestigiis Daemonum*, in the sixteenth century did not deny the reality of witchcraft but sought to refine the procedures for identifying it. For example, there are biological reasons to account for why mostly older women failed the tear and flotation tests. Weyer saw the tests as quite unsatisfactory measures of witchcraft, while never challenging the notion of witchcraft itself.

B. Burton's *Anatomy of Melancholy*, from the seventeenth century, was a quite diverse treatise. In one chapter, Burton took up the idea that the diseases of the mind were actually diseases of the brain. He offered a physiological account of "madness," although today we would regard many of his explanations ridiculous. Burton, however, offered a natural explanation for what was taken to be supernatural.

Essential Reading:

Gleitman, pp. 341-349

Supplementary Reading:

Ginzburg, Carlo. *Ecstasies: Deciphering the Witches' Sabbath*. New York: Pantheon, 1991.

Mather, Cotton. *On Witchcraft*. New York: Dorset, 1662/1991.

Robinson Daniel N. *Wild Beasts and Idle Humours: The Insanity Defense from Antiquity to the Present*. Cambridge: Harvard University Press, 1996 (Chaps. 3, 4)

Questions to Consider:

1. Identify the source from which the notion of witchcraft initially derived.
2. Explain why Christian societies were so willing to tolerate the harsh persecution of purported witches.

Lecture Four

The Emergence of Modern Science: Locke's "Newtonian" Theory of Mind

Scope: The seventeenth century—the century of Francis Bacon, Newton, Galileo, and Descartes—marks the dawn of modern science. In this century, the experimental mode of investigation was developed and defended to a previously unknown degree. The great achievements in natural science and technology made possible by these developments led to an ever more insistent question about the extent to which the mind and society could be understood in the same terms and by way of the same methods of inquiry.

John Locke's admiration for and friendship with Isaac Newton flowered into one of the most influential texts ever written on the nature of the mind: Locke's *An Essay Concerning Human Understanding*. The theory of mind developed in this work is Newtonian and mechanistic, and authoritative for later and ever more technical theories of perception and mental life.

Objectives: Upon completion of this lecture, you should be able to:

1. Identify the importance of Bacon and of Newton in putting in place the authority of science and experimentation over that of tradition and revelation.
2. Explain how Locke's theory of mind describes the manner in which elementary sensations become united into ever more complex ideas, all of the mind's "furniture" being supplied by sensory experience.
3. Explain how the mind is made fit for experimental and naturalistic study, its powers now recognized as arising from daily and direct commerce with the world of sense.

Outline

I. During the seventeenth century, the authority of science and experiment began to replace the authority of religion and Scripture. This was, however, a century of transition in which one can find reference to what we would take to be supernatural explanations. It was a transition, but it was not subtle.

- **A.** Bacon's *Novum Organum* of 1620 is perhaps the work that best represents the epoch. Bacon advocates experimental science and the scientific method. The only authority in such matters is empirical, and the best explanation is the one which is derived from the most sound method.
- **B.** Galileo's thought makes explicit a contrast between method and authority. Aristotle got it wrong when he lacked a proper method. The question is not one of genius or authority but of method.
- **C.** In Descartes' *Discourse on Method*, philosophical support is given to the transition to the authority of experience.
  1. Descartes suggests that in assessing knowledge claims, we must begin with extreme skepticism. He suggests the possibility that he is being utterly deceived. From this he concludes that the fact that he can be deceived implies that he must be a thinking being (*res cogitans*).
  2. Descartes' argument proceeds by suggesting that from the fact that he is "thinking," he must necessarily exist.
  3. Descartes' contribution in this regard is the suggestion that there must be strong grounding for philosophical and scientific claims, not just an arbitrary authority.
- **D.** Newton's "methods" of philosophizing posits that there must be a relevant observation to confirm any hypothesis. There is no theory beyond what can be confirmed by evidence. Experience was taken to be dispositive in matters where evidence conflicted with authority.

II. Locke's "Newtonian" theory of mind borrowed heavily from Newton's corpuscular theory of the universe. Thus a science of mind can take the same form as Newtonian theory.

- **A.** Elementary sensations make up the corpuscles in Locke's theory of mind. From these elementary sensations, constellations are formed through association which works in ways similar to Newtonian gravitational forces.
- **B.** Locke's method was introspective.

C. Locke concerned himself with the question of so-called "innate" ideas. From Locke's empirical perspective, there are no "innate" ideas in the Platonic sense.

Essential Reading:

Daniel N. Robinson, *Intellectual History*, chap. 7

Supplementary Reading:

Bacon, Francis. *Novum Organum*. P. Urbach and J. Gibson, trans. & eds. Chicago: Open Court, 1620/1994.

Descartes, René. *Discourse on Method* (1637) in vol. I, *The Philosophical Writings of Descartes*. J. Cottingham, et al., trans. Cambridge: Cambridge University Press, 1985.

Galilei, Galileo. *Dialogues Concerning Two New Sciences.* Henry Crew and A. de Salvio, trans. New York: Dover, 1638/1954.

Locke, John. *An Essay Concerning Human Understanding* (1690). [In many editions].

Newton, Isaac. *Philosophiae Naturalis Principia: I. The Method of Natural Philosophy*. In *Newton's Philosophy of Nature.* H. S. Thayer, ed. New York: Haffner, 1953.

Questions to Consider

1. Infer to what extent a developed science can be entirely empirical. Consider theoretical physics.
2. Conclude whether observation is theory-laden.

Lecture Five

Three Enduring "Isms": Empiricism, Rationalism, Materialism

Scope: In the previous lecture, Locke's theory of mind was shown to be "empiricistic." In this lecture we define the three dominant "isms": *empiricism*, *rationalism*, and *materialism*. The first of these, *empiricism*, locates the sources of knowledge and belief in the perceived events of the external world, according to experience itself ultimate authority on matters of fact. *Rationalism* is based on the thesis that this very experience presupposes necessary rational principles, else there can be no intelligible and coherent melding of experiences into knowledge. *Materialism* begins with the claim that, all told, only physical-material entities have real existence, so a scientifically defensible psychology must finally be based on the processes of the material body, and more specifically, the brain.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain the central precepts of the three "isms."

2. Describe the overall character of a psychology indebted to one of these to the exclusion of the others;

3. Identify main currents in today's psychology arising from each of these "isms."

Outline

I. Empiricism from Locke to Skinner: An overview

- **A.** Locke's restrained empiricism recognizes several basic "original acts" of the mind.
- **B.** Following Locke, Hume took on a more radical form of empiricism. For example, he took the concept of causation as simply the "constant conjunction" of two events. Hume psychologized what had once been a peculiar metaphysics. "Constant conjunction" relies upon what Hume took to be the laws of association.
    - **1.** Association strength is directly related to frequency of pairing.
    - **2.** Association strength is directly related to spatial and temporal contiguity.
- **C.** Hartley took the Humean principles of association, following Newtonian principles of science, and attempted to establish a systematic, physiological psychology.
- **D.** J. S. Mill, who was deeply indebted to Hume, developed an even more radical empiricism. Matter is the "permanent possibility of sensation." Anything that has real existence is in principle the subject of experience. What about "original acts" of the mind? When he gets to questions like these, he adopts the "psychological method." These ideas are not "innate," but are formed by associative processes which just happens to be in a time out of memory.
- **E.** Skinner based his behavioristic psychology on the idea that the determinants of behavior are to be looked for outside of the organism, not within the organism in somewhere known as "mind."

II. Rationalism from Descartes to Piaget: An overview

- **A.** Leibniz offered in his *New Essays on the Understanding* a critique of Locke suggesting that "nothing is in the intellect except the intellect itself." The intellect is thus the fundamental organizing principle of experiences.
- **B.** Kant suggested influentially that there are "pure intuitions" of time and space for there to be any experiences at all. Moreover, there are "pure categories of understanding" which are unaccounted for in experience itself, e.g., necessity.
- **C.** In the twentieth century, Piaget sought to understand the rationality evident in young minds.

III. Materialism from Hobbes to Churchland: An Overview

- **A.** Hobbes suggests in *Leviathan* that the essential nature of humanity is as a mechanical body.
- **B.** La Mettrie suggests in *Man: A Machine* that the soul is merely an "enlightened machine." He insists that the human mind is best understood by understanding the human brain.

C. Gall's phrenology was based on the idea that every cognitive faculty is merely a reflection of a particular physiological endowment.

Essential Reading:

Henry Gleitman, Ch. 1

Daniel N. Robinson, *Intellectual History*, Chaps. 7-9

Supplementary Reading:

Borst, C.V., ed. *The Mind/Brain Identity Theory*. (1970) New York: St. Martin's.

Eccles, John, and D. N. Robinson. *The Wonder of Being Human: Our Mind and Our Brain*. New York: Free Press, 1984.

Hume, David. *A Treatise of Human Nature* (1739). L. A. Selby-Bigge, ed. New York: Dover, 1965.

de La Mettrie, J. O. *Man: A Machine,* M. Calkins, trans. Chicago: Open Court, 1748/1912.

Questions to Consider:

1. Explain the relationship between empiricism and materialism.
2. Summarize whether a materialist thesis implies some version of determinism.

Section Two
Psychology in the Empiricist Tradition

Lecture Six
Sensation and Perception

Scope: In this lecture the student is introduced to the methods by which sensation and perception are subjected to experimental investigation and to methods of measurement. The foundations of the specialty of *psychophysics* are revealed, as are the basic laws of sensory function. Weber's Law concerns sensitivity to differences between stimuli; Fechner's Law concerns the magnitude of sensations. More recent "power law" alternatives will be cited as arising from the same rationale but leading to different outcomes.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain the principal methods of psychophysical research.
2. Summarize Weber's and Fechner's laws of sensation and the rationale on which these laws depend.

Outline

I. The seventeenth century was preoccupied with precision, due in part to the development of astronomy and the need for navigation. Because most observations in these areas were performed by the bare human eye, a growing interest in human perception began.
   - A. Weber was interested in the accuracy of human perception. He did several studies to determine the just-noticeable different point for various modes of perception. He determined the following pattern in human perception: the difference between the standard and comparison weights over the standard weight yields a constant. Thus perception obeys a law.
   - B. Fechner sought to develop a new science—psychophysics—to determine the precise relation between the physical and the psychic realms.
     1. Why did Fechner assume that such lawful relationships exist? He suggested that his confidence was derived from Weber's law.
     2. Fechner was seeking to determine a law of sensation, not simply a law of discrimination.
     3. There is of course the problem of quantifying sensations. The absolute threshold is the lowest energy at which a percipient detects a stimulus. If one adds energy from the absolute threshold, one can add it until one gets to the first just-noticeable different point. Fechner assumed that the experiences one has are the accumulation of just-noticeable difference points. Thus, integrating Weber's ratio, Fechner was able to develop his own law of sensation: R=KlogS. Sensation grows in proportion of the logarithm of stimulus intensity.
     4. Fechner's law does not hold for loudness, touch, etc. Stevens, from Harvard, developed his power law to account for such modes of perceiving.

II. There is no area of psychology which has more law-like data than psychophysics. The data is quite precise and reproducible, often more so than basic physiological data. Sensory psychology is the area of psychology in which it is most viable to argue for the nomological-deductive model.

Essential Reading:
Henry Gleitman, Ch. 4, pp. 110-115.

Supplementary Reading:
Fechner, G.T., *Elements of Psychophysics* (1860). Helmust Adler, trans. New York: Holt, Reinhart & Winston, 1966.

Questions to Consider:

1. Conclude whether psychophysics explains the *experience* of perception.
2. Summarize to what extent physiological inquiry can explain being human.

Lecture Seven

The Visual Process

Scope: The visual system is a miracle of organization and function. Its anatomical features related directly to many of the salient facts of visual perception. It is also the system most studied and most known within the field of experimental psychology, thereby revealing one of the more scientific sides of the discipline.

At the absolute threshold, the visual system is able to detect levels of photic energy involving no more than a small number of quanta. The slightest changes in intensity are detected, as are very small differences in wavelength. Normal color vision is the gift of special chemical systems operating within the receptors of the retina. And it is deficiencies in these systems that explain the otherwise peculiar facts of color blindness.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain absolute and difference thresholds.
2. Describe the gross anatomy of the eye and of the retina.
3. Explain the "duplex" nature of vision; vision mediated by the rod-receptors and the cone-receptors, the latter mediating the experience of color.
4. Explain color blindness as the result of deficiencies in the pigment-chemistry of the cone system.

Outline

I. Gross Anatomy of the Eye

A. The system is designed to pick up electromagnetic radiation that falls within a particular spectrum.

B. Within the retina there are thousands and thousands of receptors cells, which respond to the light projected upon them. These cells are also referred to as transducers, because they receive energy in one form and pass it into another form. In this case, the energy is translated from light energy into electrical energy.

C. In the human visual system, there are two kinds of receptors within the retina. Thus, the retina has a duplex structure, being composed of both rods and cones. In the fovea, there are only cones. In the extreme periphery of the retina, there are only rods. Overall, however, rods greatly outnumber the cones.

D. The rods and cones converge on bipolar cells which feed the retinal ganglion cells, which is the first true neuron in the visual system. Each axon of the retinal ganglion cells forms a single optic nerve fiber. Each optic nerve fiber takes a signal from multiple rods and cones. The ratio in the fovea of cones to optic nerve fibers is approximately one to one. In the periphery, there are several thousand rods for a signal optic nerve fiber. Thus, visual acuity is high in the fovea, but less in the periphery. The peripheral retina has a lower absolute threshold, however, because of the resultant summing effect.

II. Color Vision

A. Because cone vision is chromatic and rod vision is achromatic, the periphery is achromatic, and color vision is given primarily by the fovea and central retinal region. The photopigments of the cones respond selectively to a different part of the color spectrum. It is in the overlapping function of these systems that we perceive varying shades and hues.

B. The normal percipient can detect and match any color stimulus, provided that he or she can manipulate three wavelength ranges. This is trichromatic vision.

C. In some instances, there is a person with dichromatic vision, having the ability to receive only two wavelengths of color. There are, on rarer occasion, persons with monochromatic or bona fide achromatic color vision.

D. The standard trichromatic theory matches up with the pigment chemistry of the rods and cones. There are, however, certain forms of color blindness for which it cannot account. For instance, a dichromat lacking the ability to see green may still be able to see yellow. On the trichromatic account, however, if one cannot see green, one should not be able to see yellow either. This can be accounted for with the opponent process theory. The opponent process model looks very much like the electrophysiology of the visual system.

Essential Reading:

Henry Gleitman, Chap. 4, pp. 124-139.

Supplementary Reading:

Rock, I. *An Introduction to Perception* (1975) New York: Macmillan

Questions to Consider:

1. Summarize what it is in the anatomy of the eye that allows the person to experience sight.
2. Identify what other forms of blindness you know and how they would be accounted for.

Lecture Eight
Hearing

Scope: The auditory system is also extremely acute, able to detect sound near the level of Brownian motion! The mechanisms by which the loudness and pitch of sound are heard have been well studied. More complex achievements—such as tonality in music and the recognition of highly distorted signals—have also been scientifically explored.

The loud world of industry and urban life poses threats to this complex and delicate system. Some auditory pathologies are considered in light of these modern assaults, many of them self-inflicted.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain the rudiments of sound as a stimulus; waveforms, frequency, amplitude, spectra.
2. Summarize the dynamics of the inner ear (basilar membrane) to show how physical features of stimuli are "coded" in the periphery of the nervous system.
3. Describe how there is successively sharp "tuning" of information as signals proceed from the periphery of the nervous system to the auditory cortex.
4. Explain how the modern "ecology" of sound is a threat to the proper functioning of the auditory system.

Outline

I. Gross Anatomy of the Ear

A. Our sensitivity to sonic vibrations ranges from 20-30 cycles per second to 15,000-18,000 cycles per second.

B. The outer ear functions similarly to the cornea. It collects the sounds that we hear.

C. A semi-circular canal carries sound to the eardrum, which is a very thin membrane that resonates at the same frequency as the entering sound. It has a very high sensitivity.

D. Connected to the eardrum are the hammer, anvil, and stirrup, which make up the middle ear. Vibrations in the eardrum force the hammer to strike the anvil, which vibrates the stirrup.

E. The stirrup in turn vibrates the oval window, the dividing line between the middle ear and the inner ear. Connected to the oval window is the cochlea, which is filled with fluid in which the basilar membrane is suspended. When the oval window vibrates, the basilar membrane moves in a wave-like motion, displacing hair-like receptor cells which transduce the input into electrical energy and transmit the signal to neuronal cells.

II. Coding in Audition

A. Loudness and pitch are coded as neural impulses per second. Thus we often perceive loudness as changing when pitch changes, and vice versa.

B. There is a mechanism for differentiation, however, because the widest region of the basilar membrane is activated most by lower frequency sounds. There is a large degree of overlap, thus making this method of differentiation gross at best.

C. As one measure of the response to a particular stimulus, as one goes deeper into the auditory process, the response becomes more and more precise, as fewer cells are activated.

D. At higher frequencies, because neuron firing cannot keep up with impulses per second, a kind of volley-coding is involved. At these frequencies, there are fewer confusions between pitch and loudness, because there is no volley-coding for loudness.

E. If a given portion of the basilar membrane is constantly undulated at high intensities, one can acquire tonal gaps, which can be displayed by audiograms.

Essential Reading:

Henry Gleitman, Chap. 4, pp. 120-23

Supplementary Reading:

E.B. Goldstein, *Sensation and Perception* (3rd ed., 1989): Belmont, California: Wadsworth.

Questions to Consider:

1. Explain the phenomenon of tone deafness.
2. Explain what neurological factor facilitates the development of sharpened hearing to compensate for dulled vision.

Lecture Nine
Signal-Detection Theory

Scope: As it happens, thresholds and measures of sensitivity are not as straightforward as one might suppose. The more difficult a discrimination or detection task, the more likely it is that the observer will be influenced by subjective factors of a non-sensory nature. Indeed, comparable factors are at work even when complex detection systems—such as radar installations—are used to determine the nature of detected targets.

Perception research and theory in recent decades has availed itself of signal detection theory as a way of quantifying and controlling the observer's internal and non-sensory threshold criteria. A review of this theory shows that it is of general applicability across a range of contexts in which judgments are made.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize how the concept of a "threshold" is rather more complex than first suspected.
2. Describe how the "payoff" conditions in any detection task can significantly alter measures of sensitivity.
3. Identify the heuristic value of the signal-detection model and the "receiver operating characteristics" (ROC) curve in a variety of contexts, including, "She loves me; she loves me not" contexts.

Outline

I. The task of signal-detection reconsidered: in any setting or transmission system, noise is omnipresent. The question becomes how do we distinguish and separate out meaningful or significant noises? One answer is given by the signal-detection theory.

- **A.** How was Cold War U.S. detection able to distinguish between a duck and a warhead? The problem is how to determine the criteria for identification.
  1. One input which can be given to the system is velocity. One may also input data on trajectory.
  2. As more information is given to the system, the likelihood of a false alarm decreases and the likelihood for success increases.
- **B.** The only way which one can have a zero false alarm rate is to call nothing an ICBM. On the other hand, one can suggest that the priority is not to miss an ICBM. In order to ensure this goal, one must call everything an ICBM. The question is one of balance.
- **C.** An ROC curve represents the probability of correct detection versus the probability of a false alarm.

II. The effects of a payoff matrix on response threshold.

- **A.** Standard psychophysical experiments are built to eliminate guessing. This is very much like telling the subject to never call a duck an ICBM. Thus, the system may be much less sensitive.
- **B.** The subject may be given room on the low threshold side by offering a payoff matrix. One can make it quite in the subject's interest to offer a positive response by rearranging the payoff matrix.
- **C.** In studies where subjects are encouraged to guess, the subjects perform better than chance.
- **D.** Properly conducted studies on the signal-detection model seem to question the notion of a lowest threshold. When guessing is encouraged, the sensory systems, even at the lowest energy levels, will do better than chance.

III. The signal detection model is a quite useful heuristic in psychology. We constantly have to sort through omnipresent noises to determine the signal. The inability to do this is a characteristic of paranoid schizophrenics.

IV. If one wants to increase the correct detection rate while maintaining a low false alarm rate, one can build memory into the system and introduce better rules for distinguishing the signal from the noise. Rules of evidence are an example of the latter.

Essential Reading:

Henry Gleitman, Chap. 4, pp. 114-15.

Supplementary Reading:

Green & Swets, *Signal Detection Theory & Psychophysics*. (1966) New York: Wiley.

Questions to Consider:

1. Explain why context affects perception.

2. Conclude what these findings suggest about scientific observation.

Lecture Ten
Perceptual Constancies and Illusions

Scope: The complexities as well as the functions of perception are often revealed in illusory phenomena. The interaction between knowledge and perception is so thorough that what one *knows* often determines what one *perceives*. A familiar acquaintance viewed on a distant hill is still *seen* as being six feet tall, though the image projected onto the retina is very small. But an unknown or meaningless object having this same retinal size is seen as being as small as it actually is. The tendency to perceive well-known items as having constant attributes is very strong. Dishes viewed at any angle are perceived as circular, though their retinal projection is elliptical. There are obvious advantages to systems that function in such a way, for otherwise the world of objects would be different from moment to moment.

Some illusory phenomena are less a weakness of the perceptual systems than another version of their adaptive strength, for they indicate how perception is shaped by the overall context; the context of meanings, of other objects, of interpretive possibilities; and the broad *cultural* context as well.

Objectives: Upon completion of this lecture, you should be able to:

1. Identify a number of well-known constancy and illusory phenomena.
2. Explain constancies and illusions within the general framework of *contextual* and cultural determinants of perception.
3. Explain the adaptive advantages conferred by such perceptual tendencies.

Outline

I. Perception involves complex experiences, while sensation involves experiences that are minimally influenced by background assumptions and memories. Thomas Reid suggested that a sensation can occur without being the result of an external object, whereas perception cannot.

II. Often times, past experience determines perceptual outcome, as demonstrated by constancy phenomena.

- **A.** Size constancy is an example of how expectations in size affect the way in which one actually sees a situation.
- **B.** Distal cues determine how an object is perceived when the object being perceived is known. Proximal cues determine the perceptual experience in instances in which one is unfamiliar with the object.
- **C.** Size and shape constancy, rather than casting doubt on the abilities of the perceptual system, represents how the perceptual system overcomes distortions that occur at a purely sensory level.
- **D.** Constancy is an essential aspect of perception in order for us to make sense of the world, because the external world never presents itself identically on separate occasions. Constancy allows us to identify objects as themselves.

III. Context is an important factor in constancy phenomena.

- **A.** Context can create illusory phenomena. The Moon Illusion is one example of such an illusory phenomenon. The moon at its zenith appears much smaller than the moon on the horizon.
  1. One incorrect explanation is that the contextual cues at the horizon provide distal cues that make the moon seem larger. When the moon is at its zenith, one must rely on the proximal cues.
  2. Another explanation is that the horizon moon is seen through a cloudy urban atmosphere. This causes the light to disperse, whereas the same effect is not present when one looks at the moon at its zenith. That is simply not correct, because one is looking at the same murkiness when looking straight up.
  3. Another explanation is based on the suggestion that the "angle of regard" affects how one sees the size of the moon.
  4. These means cannot account for the phenomenon, because when the contextual clues and angle of regard are held constant, the same perceptual experience is had by the percipient.

B. The Moon Illusion is interesting because it seems to violate the size constancy effect. On the usual account, one would expect the size of the moon to be invariant.

IV. On no two successive occasions is our biological self constant. How could one possibly then know that she is the same? The continuing sense of our selves as continuing beings is a striking example of constancy.

A. Some are inclined to say that the sense of self is derived from memory. This was an argument forwarded by Locke in his example of the prince and the peasant.

B. This possibly cannot work, because amnesiacs often have a sense of self. If this were true, delusions would define selfhood. No one would be willing to argue for such a fluid, nonsensical version of the self.

V. Other perceptual illusions are described.

A. The Poggendorf illusion.

B. The Müller-Lyer illusion.

VI. People raised in non-line and angle worlds, in a very natural setting, display a greatly reduced illusory effect. Thus, the suggestion has been made that our cultural context furnishes the mind with particular perceptual tools.

Essential Reading:

Henry Gleitman, Chap. 5 and especially pp. 145-46; 160-64

Supplementary Reading:

S. Coren and J. Girgus, *Seeing Is Deceiving: The Psychology of Visual Illusions*. (1978) Hillsdale, New Jersey: Lawrence Earlbaum

M. H. Segall et al. *The Influence of Culture on Visual Perception*. (1966) New York: Bobbs Merrill

Questions to Consider:

1. Conclude whether, if culture influences perception, sciences that rely on observation are culturally bound.
2. Explain to what extent, if expectations influence perception, and hypotheses represent the expectations of scientists, scientific observation is biased and whether this matters.

Lecture Eleven

Learning and Memory: Associationism—Aristotle to Ebbinghaus

Scope: Since time out of memory, the "folk psychology" of the ages has understood that "practice makes perfect," "as the twig is bent, so grows the tree," etc. The ancient world already possessed well-developed and widely used "mnemonic" techniques for remembering names, faces, and places, but it was Aristotle who first tried to reduce trial-and-error learning to general laws based on the formation of associations through repeated experience. His theory of memory "traces" has been a staple in the literature ever since.

The experimental study of associative learning and memory reached its full modern expression in the work of Hermann Ebbinghaus, who contributed the memory drum, the "nonsense syllable," and the early experimental data describing the formation and stability of associative memories.

Objectives: Upon completion of this lecture, you should be able to:

1. Describe ancient mnemonic techniques and those developed in later ages to support prodigious memories.
2. Summarize Ebbinghaus' use of nonsense-syllables in paired-associates learning, his measure of "savings," the phenomena of proactive and retroactive interference, and the "span of apprehension."

Outline

I. The ancient world paid a good deal of attention to memory.

- **A.** Aristotle was the first to develop a systematic theory of memory.
  - **1.** He suggested that the things to which we have been most often exposed are those of which we have the strongest memories.
  - **2.** His associationistic memory is based upon biology. Memory is a kind of impression on the biological system. It is the earliest version of a trace theory of memory.
- **B.** The ancients also understood that there were several mnemonic devices which could be used as memory aids. A mnemonic systematizes a wide array of information into a simpler form. To this day there are professional mnemonists in the entertainment industry.

II. Medieval conceptions of memory held memory to be what we regard today as intelligence. The quality of one's mind was measured by what one could remember.

III. Through it all, most theories of memory have relied upon repetition and association. Ebbinghaus, from this associationistic perspective, was the first to engage in experimental studies of memory.

- **A.** In order to do his studies, to be able to hold repetition, etc., constant, he developed the notion of a nonsense syllable, i.e., syllables without prior associational value.
- **B.** He would pair the trigrams with a particular word. After one iteration, the subject would try to pair the word with the trigram.
- **C.** The results of his study supported the trace-decay theory of memory.
- **D.** Ebbinghaus also studied memorial savings. He demonstrated that the efficiency of memory is a function of repetition and time between testing. Moreover, with time, performance is not weakened equally across the board. The early and later pairs are better remembered.
  - **1.** One explanation for the serial position effect is the idea of interference.
  - **2.** In this regard, modern psychology has done wide-ranging studies on the primacy and the recency effects.

IV. How much information can be held at one time, and what is the span of apprehension?

- **A.** One must distinguish that which we hold in memory on a one-exposure basis and that which is the result of repetition. The former notion is called the span of apprehension.
- **B.** Coherence and meaning are aids to memory, even on the first presentation. The meaningfulness of the event influences the span of apprehension.

C. Nonetheless, a relative constancy emerged. The span of apprehension appears to be usually 6-8 items.

D. Such simple span-of-apprehension studies do not present the whole picture. Many of the studies do not distinguish between memory and retrieval limits. There are studies, however, in which retrieval has been studied independently of memory. Giving retrieval cues demonstrates that the span of apprehension studies underestimates the capacity of memory by mistaking limitations in retrieval as limitations in memorial capacity.

Essential Reading:

Henry Gleitman, Chap. 6

Supplementary Reading:

H. E. Ebbinghaus, *Memory: A Contribution to Experimental Psychology* (1885). (1964) New York: Dover (reprint)

E. Tulving and W. Donaldson, eds. *Organization of Memory*. (1972) New York: Academic Press

R. S. Lockheart and F. Craik, "Levels of processing: A retrospective commentary on a framework for memory research." 1990 *Canadian Journal of Psychology*, vol. 44, pp. 87-122.

Questions to Consider:

1. Explain whether associationistic principles can account for all forms of learning.
2. Explain how studies which have shown that the span of apprehension varies over languages can be understood.

Lecture Twelve
Pavlov and the Conditioned Reflex

Scope: The reflex concept is an old one in psychology, developed by Descartes in the seventeenth century, studied at the level of spinal physiology in the eighteenth, and put on a modern scientific base by Marshall Hall in the nineteenth. With this as background, Pavlov's pioneering research and bold theory are offered as the harbinger of the thoroughly *behavioristic* psychology that dominated the field from the 1950s to the 1970s.

Pavlov's methods are explained, his theory summarized, and his influence charted. The principles of Pavlovian psychology have been featured in fiction ("Clockwork Orange") and have been modified to provide forms of behavior-therapy (e.g., "systematic desensitization") and "biofeedback."

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize the general history of the "reflex" concept from Descartes to Marshall Hall.
2. Describe Pavlov's studies of gastric physiology and the context in which his famous studies of conditioning arose.
3. Explain the techniques and general terms of Pavlovian conditioning.
4. Describe the general Pavlovian theory.
5. Summarize the influence and some of the applications of the theory.

Outline

I. Perhaps the earliest reflex theory was offered by Rene Descartes.

- **A.** Statues in the Royal Gardens in France, which moved on the basis of hydraulic systems, provided a model for the Cartesian model of learning.
- **B.** He thought that the movement of animal spirits through nervous tubules accounted for the movement of animals. He saw animals as a kind of mechanical device.
- **C.** For Descartes, the brain was of central importance for regulating the movement of animal spirits. Descartes thought that the pineal gland was the control center for movement.

II. The Science of Research Physiology of the Eighteenth Century

- **A.** Robert Whytt demonstrated that one can get reflex movements by stimulating the spinal chord of an organism. He did systematic studies on the organization of the spinal chord.
- **B.** Marshall Hall established a systematic reflex theory of inputs mediated by the spinal chord reflected in particular outputs.

III. Pavlov and Pavlovian Conditioning of the Early Twentieth Century

- **A.** He won the Nobel Prize for his experiments on gastric physiology and the process of digestion. His Nobel Prize address introduced his work on classical conditioning.
- **B.** He would repeatedly pair powdered food with a tone. After several trials, the dog would salivate at the sound of the tone. Moreover, the amount of saliva produced was directly related to the number of pairings.
  1. Pavlov developed the following terminology: the food, which will elicit salivation naturally, is the unconditioned stimulus.
  2. The tone, which produces salivation when paired with the unconditioned stimulus, is called the conditioned stimulus.
- **C.** Having established this general pattern, Pavlov made a number of other important observations.
  1. Hearing a range of tones, the greatest amount of salivation is at the frequency of the conditioned tone. As one moves further from this tone, there is a systematic decrease in the magnitude of the response. This is stimulus generalization.
  2. Similarly, one can present food for a given tone, and present other tones while not presenting food. There is less stimulus generalization. Pavlov referred to this as stimulus discrimination.

3. If the process is kept up to make the discrimination sharper and sharper, the animal ultimately breaks down. This condition was deemed experimental neurosis. The organism was being forced to make discriminations that went beyond its capacities.

D. Pavlov was insistent that physiology provided the ultimate explanation for psychological life. The language of psychology, on the Pavlovian account, could be replaced by the language of physiology. For example, he regarded stimulus generalization as a function of overlapping activations in the nervous system. Although this works for the auditory system, other parts of the nervous system do not share this particular organization.

Essential Reading:

Henry Gleitman, Chap. 3, pp. 70-77

Daniel N. Robinson, pp. 246-51; 358-61

Supplementary Reading:

I.P. Pavlov, *Conditioned Reflexes*, G.V. Anrep, trans. (1927) New York: Oxford University Press.

J. Wolpe, *The Practice of Behavior Therapy*. (1973) New York: Pargamon.

Questions to Consider:

1. Conclude whether the language of psychology can be replaced by the language of physiology.
2. Explain how much of human life is analogous to the classical conditioning model.

Biographical Notes

B. C.

c.a.750 ....**Homer**: The blind poet who composed *Iliad* and *Odyssey,* in which the conditions influencing human thought, feeling, and action are developed.

469?-399.............**Socrates**: The father of that branch of philosophy that is concerned with the human condition, in contrast to the nature of the cosmos and the physical world. His teachings are developed systematically by his greatest student, Plato, in a collection of dialogues.

460?-377?...........**Hippocrates**: The father of Greek medicine whose students, the Hippocratics, practiced a holistic medicine that included dietary, aesthetic, and surgical forms of treatment.

427?-347.............**Plato**: The founder of the Academy in Athens, the first great school of philosophical studies, and the author of more than a score of dialogues that would set the agenda for much subsequent philosophical inquiry.

385-322...............**Aristotle**: The first systematic philosophical psychologist whose writings sought to integrate the biological, psychological, social, and political dimensions of life and to offer a developed theory of personality development as a function of these various influences. His school, the Lyceum, featured an extensive curriculum that included the natural sciences, politics, psychology, and ethics.

372?-287.............**Theophrastus**: Succeeded Aristotle as director of the Lyceum, where he organized the studies for more than three decades. His treatise on *The Moral Characters* is an early "type" theory of personality.

A.D.

130-200...............**Galen**: One of the earliest experimental biologists of the post-classical period. He practiced vivisection on a variety of animals, including pigs whose vocalizations he was able to eliminate by sectioning the recurrent lingual nerve, thus locating vocalization in the brain. His psychobiological theory of the "humours" was influential for centuries.

1515-88...............**Weyer**: Johann Weyer's treatise on witchcraft, *De Prestigiis Daemonum* (1579) was among the first to connect "witchery" to mental disturbances, chiefly melancholy.

1561-1626...........**Bacon**: Francis Bacon's *The Proficience and Advancement of Learning* (1605) signaled the rise of the modern scientific perspective. His *Novum Organum* (1620), the second part of his *Great Instauration*, would serve as something of a bible for the experimentally and scientifically inclined writers of the seventeenth and eighteenth centuries.

1564-1642...........**Galileo**: His astronomical observations and experiments in mechanics supported his writings in the philosophy of science, which proved to be authoritative in overthrowing much of the "old wisdom." His classic *Dialogues Concerning Two New Sciences* (1638) summarizes thirty years of research and the theories supported by it.

1596-1650...........**Descartes**: His research and writing did much to advance biological psychology, chiefly through the concept of reflex mechanisms and the general theory according to which many sensory and motor functions could be explained mechanically. He also defended a form of dualism that denied that the rational operations of the mind were causally brought about by material or biological processes. His *Treatise of Man* (1662) appeared posthumously and is the most "materialistic" of his psychological writings.

1642-1727...........**Newton**: Isaac Newton's *Principia* (1687) established the "rules" for scientific experimentation and theorizing that would be taken as authoritative thereafter.

1632-1704...........**Locke**: John Locke, a friend and great admirer of Newton's, set out in his *An Essay on Human Understanding* to develop something of a Newtonian theory of mind, and a Newtonian approach to the study of mental life in which basic sensations form simple and then more complex ideas by an associational process akin to gravitation.

1748-1832...........**Bentham**: Jeremy Bentham's *Principles of Morals and Legislation* (1789) tied all significant human and animal activity to considerations of pleasure and pain and all morality to considerations of utility.

1758-1828...........**Gall**: Franz Joseph Gall was the father of phrenology and one of the great neuroanatomists of the eighteenth century. His research and writings strongly supported the neurological perspective on psychology. His *Investigations on the Nervous System in General and on that of the Brain in Particular* (1809) was a multivolume contribution that was widely read and translated.

1795-1878...........**Weber**: E.H. Weber, the Leipzig physiologist, carefully studied the sense of touch and the ability of observers to discriminate weights of different magnitude. From these studies he was able to frame the first general law of sensory function, *Weber's Law*, which he published in 1835.

1801-87...............**Fechner**: Gustav Fechner's *Elemente der Psychophysik* (1860) established the experimental methods and overall perspective for research on sensation and perception. The work also includes his derivation of Fechner's Law.

1806-73...............**Mill**: John Stuart Mill did much to advance both empirical psychology and the experimental methods of inquiry. His *A System of Logic* (1843) defended the scientific and experimental approach to "human nature."

1808-82...............**Darwin**: Charles Darwin's *Origin of Species* (1859) and his *Descent of Man* (1871) put an essentially evolutionary psychology on the map of thought and gave impetus to the fields of comparative psychology and developmental psychology.

1817-68...............**Griesinger**: His *Mental Pathology and Therapeutics* (1845) begins with the claim that mental disease is grounded in disease processes in the brain.

1821-94...............**Helmholtz**: The premier scientist of the German-speaking world at mid-century, Helmholtz would advance significant theories on the physiology of auditory and visual functions. The original of his *Treatise on Physiological Optics* appeared in German in successive volumes between 1856 and 1866.

1824-80...............**Broca**: Pierre Broca identified and in 1861 reported the region of the brain which, when destroyed by a lesion, resulted in the patient's inability to speak; so-called Broca's aphasia.

1832-1920...........**Wundt**: The father of experimental psychology, Wilhelm Wundt founded the first university laboratory devoted to the subject in 1879 at the University of Leipzig.

1834-1918...........**Maudsley**: In his *The Physiology and Pathology of the Mind* (1867), Henry Maudsley provided robust clinical data and strong arguments in support of the medical model of mental illness.

1848-1905...........**Wernicke**: Carl Wernicke's clinical observations located the region of the brain which, when diseased, permitted the patient to speak coherently but not to comprehend the spoken word; Wernicke's syndrome.

1842-1910...........**James**: Perhaps the greatest of all psychologists, William James brought an irresistible literary style and great analytical and critical power to bear on the larger as well as the smaller issues in psychology. His *Principles of Psychology* (1890) is still the best systematic introduction to the subject.

1849-1936...........**Pavlov**: The discovery of the "conditioned reflex" and the general theory accounting for it are credited to Ivan Pavlov, who relentlessly advocated a purely biological approach to the issues traditionally regarded as "psychological." He advanced an outline of his position in his Nobel Prize address of 1905.

1850-1909...........**Ebbinghaus**: Hermann Ebbinghaus's *On Memory* (1885) was a pioneering work in the field of memory research.

1856-1939...........**Freud**: The father of psychoanalysis and the most influential psychologist of the twentieth century. With Breuer he published *Studies of Hysteria* in 1896, a prelude to the future theory of hysteria as the outcome of repression.

1857-1911...........**Binet**: Alfred Binet and Theodore Simon published *The Development of Intelligence in Children* in 1905 and helped launch the mental-testing movement.

1874-1939...........**Thorndike**: E.L. Thorndike's *Animal Intelligence* (1898) offered the first published records of the time-course of animal learning and presented the model of "instrumental conditioning" that would be the model of later behaviorist research.

1875-1961...........**Jung**: In his *Psychological Types* (1920) Carl Gustav Jung departs further from the traditional Freudian theory and develops the theory of the introverted and extroverted "types."

1878-1958...........**Watson**: The father of "American Behaviorism," John B. Watson opposed the mentalistic psychologies of his day and advocated as the proper subject of psychological investigation the actual observable behavior of human and nonhuman animals. His famous defense of this position appeared in his article in *Psychological Review* in 1913, "Psychology as the behaviorist views it."

1886-1961...........**Tolman**: E.C. Tolman's *Cognitive Maps in Rats and Man* (1948) summarized numerous and ingenious studies establishing the essentially cognitive nature of problem-solving.

1887-1967...........**Köhler**: One of the fathers of Gestalt psychology, Wolfgang Köhler published his seminal work on *Gestalt Problems and the Beginnings of Gestalt Theory* in 1925.

1890-1958...........**Lashley**: In *Brain Mechanisms in Intelligence* (1929), Karl Lashley offered an early installment of an illustrious career devoted to the study of central mechanisms in learning and problem-solving.

1896-1974...........**Piaget**: Jean Piaget's *The Child's Representation of the World* appeared in 1926 in French, but his influence was much later in the English-speaking world.

1904-88...............**Skinner**: B.F. Skinner's *Behavior of Organisms* appeared in 1938 and was followed by texts and articles establishing him as the major figure in the history of behaviorism.

Glossary

Absolute threshold: The minimum amount of stimulation sufficient to be experienced

Agnosia: The failure to comprehend the meaning or function of things otherwise correctly and accurately perceived.

Anthropomorphism: A form of explanation of non-human attributes in terms of allegedly comparable human attributes. Thus, the formation of ants approaching another colony is explained as an "army" ready to engage in "war."

Aphasia: Either expressive (as in Broca's aphasia) or receptive, the inability to use language.

Apraxia: The inability to perform stereotypical but complex movements such as putting on a jacket.

Anal stage: The second of Freud's stages of psychosexual development; the stage at which bowel functions are associated with sensual gratification.

AI: The acronym for "artificial intelligence."

Artificial intelligence: A form of "intelligent" or problem-solving performance achieved by a programmed computational device.

Basilar membrane: A membrane in the inner ear's cochlear duct along the length of which are the auditory receptor ("hair") cells.

Behaviorism: The theory or perspective according to which observable behavior is the exhaustive subject matter of a scientific psychology.

Biofeedback: The technique for making available to the observer information regarding his or her own physiological states and events; e.g., a visual display of one's own blood pressure or heart rate or skin resistance.

Bipolar: The form of manic-depressive illness in which episodes of both mania and depression occur, as distinct from *unipolar*.

Broca's Aphasia: An expressive aphasia resulting from a lesion in Broca's area, the third frontal convolution in the left hemisphere.

CAT scan: CAT is the acronym for computerized axial tomography; a radiographic technique for constructing three-dimensional anatomical pictures.

Catharsis: In psychoanalytic theory, the release (Gk. *catharsis*) of blocked psychic energy, typically by way of free-association and sustained talk.

Cognitive maps: Tolman's term for the apparent mental or cognitive representation of the external world, such that the rat is able to frame alternative courses of action to reach a desired goal.

Cones: In vision, the retinal receptor cells whose activation takes place in dim and brighter light, though not in darkness; cells that mediate the experience of color.

Conservation:

(a) In psychoanalytic theory, the principle according to which psychic energy in the system is "conserved," though it might express itself in a variety of ways; e.g., it might be expressed in the form of physical symptoms.

(b) In Piaget's theory of cognitive development, a principle that is understood only by older children; the principle according to which, e.g. the quantity of a thing is not changed when it is given a different shape.

Constancy (perceptual): The tendency to see known objects as retaining their known size and shape even as they are moved to more distant locations or are differently oriented; e.g., a saucer seen as round even when presented horizontally.

Conversion reaction: In psychoanalytic theory, the explanation of hysterical symptoms as the result of a conversion of psychic to physical processes.

Depth psychology: Psychological theories based on the concept of the unconscious, otherwise inaccessible at the superficial levels of perception and introspection.

Difference threshold: The minimum difference between two stimuli sufficient for the observer to distinguish between them.

Duplex theory: The theory (fact) that vision is mediated by two functionally different types of receptors, rods and cones; the former activated at the lowest levels of illumination but unable to mediate the experience of color; the latter activated at higher levels of light intensity and associated with the perception of color.

Eudaimonia: In Aristotle's theory that form of "happiness" or "flourishing" that might be achieved by one whose overall form of life is rationally ordered and virtuous.

Ego: The "self" or "I" in psychoanalytic theory, fashioned out of the competing forces of the instinctual and the social.

Empiricism: That philosophical perspective according to which knowledge is grounded in experience, and experience is the ultimate standard of all knowledge claims. It may be contrasted with both rationalism and nativism.

Expert systems: A branch of engineering that seeks to identify the attributes of human expertise (e.g., medical diagnosis) and incorporate them into complex computational programs.

Extrovert: According to Carl Jung, the two dominant personality tendencies are toward extroversion or introversion, each of these forming a "type" of personality which, when known to the psychoanalyst, permits predictions in a wide range of circumstances.

Functionalism: A quite general perspective on biology and psychology according to which various processes or attributes are understood in terms of the functions served by them. Thus, the right question to ask about, e.g., "consciousness," is not what it is, but what it is *for*; what can be achieved by the organism possessing it which cannot otherwise be achieved.

Frontal lobe syndrome: A set of cognitive defects, often involving disrupted perceptions of events taking place over a stretch of time.

Genital stage: The final stage of psychosexual development in which sexual gratification is achieved through heterosexual intercourse.

Glove Anesthesia: A classic form of hysterical symptom in which sensitivity is diminished or lost over the region of the hand that would be covered by a glove, this not being possible as a result of actual nerve damage.

Heritability: The fraction of the total variance displayed by a characteristic that is attributable to genetic sources of variation.

Hermeneutics: Originally reserved to the field of biblical or scriptural interpretation, now used more generally to refer to explanation as a form of interpretation.

Heuristic: A device or scheme that aids in the diagnosis and solution of problems.

Hypnosis: The means or practice by which cooperative subjects can be placed in a state of semiconsciousness or unconsciousness but can still be "reached" in such a way as to alter their perceptions and actions.

Hysteria: Initially, an assortment of temperamental, perceptual, and behavioral abnormalities thought to be associated with childbirth and other gender-specific conditions; hence the word, which is a version of the ancient Greek for *uterus*; later referring indifferently to men and women displaying such perceptual, behavioral and emotional disturbances.

Id: In Freud's theory, the basic, instinctual core of drives inherited as part of the animal ancestry of the human race; tendencies toward self-gratification and self-preservation without the regulative influences of civilization.

Instinct: A typically complex pattern of behavior (i.e., unlike reflexes) exhibited (nearly) universally within a species or by one gender in that species, and appearing in essentially complete form without the benefit of practice or training.

Instrumental conditioning: The term used to designate conditioned behavior that is instrumental in problem-solving or in reaching a goal; as distinct from reflexes.

IQ: The "intelligence quotient" calculated by dividing mental age by chronological age and multiplying by 100. A 10-year old who scores at the mental level of the average 12-year old has an IQ of 120 (12/10 X 100).

Lateralization: The tendency of certain perceptual or behavioral capacities to be localized in one but not both halves of e.g., the cerebral cortex. Thus, lesion in the left hemisphere leads to paralysis on the right side of the body, etc.

Law of effect: Thorndike's law, stating that behavior is strengthened or weakened by the effects it produces; behavior leading to a "pleasing state of affairs" thus becoming more likely; that leading to pain or punishment, less likely.

Limbic system: In highly integrated collection of structures below the cerebral cortex and having strong associations with basic emotional patterns of behavior such as copulation, aggression, maternal activity, etc. The structures include the amygdala, the septum, the Isle of Rile, the hippocampus and the columns of the fornix.

Machine functionalism: A concept in contemporary philosophy of mind that would equate intelligence or cognition not with a specific anatomy (e.g., the brain) or type of animal (e.g., human) but with any generic device able to perform intelligent or cognitive functions.

***Malleus Maleficarum*:** "The hammer of evils" was *the* book in the fifteenth century that informed courts on the procedures for identifying witches and the punishments to be imposed on them. Written by two Dominicans (Sprenger and Kramer) it offered a perilous mixture of science, pseudo-science, and rank superstition.

Manic-depressive: A form of psychosis; a severe mental illness in which the sufferer experiences delusions and is overcome by episodes of uncontrollable and even suicidal depression and/or destructive forms of mania.

Materialism: That philosophical school or system that takes the ultimate reality to be a material reality, finally lacking in any other kind of "stuff"—notably "mental" stuff.

Mnemonic: A technique for aiding memory.

Nativism: A psychological orientation or theory according to which certain mental or cognitive powers are innate, requiring only time for maturation before expressing themselves in their full form.

Neo-Freudian: The member of a psychoanalytic school or system indebted to Freudian theory but departing from it to a greater or lesser extent.

Noise: A technical term referring to any event or entity that interferes with the detection of a target-stimulus.

Nomological-deductive model: Developed and defended by Carl Hempel, a model of scientific explanation based on the proposition that an event has been explained scientifically when it is shown to be deducible from a general law (Gk. *nomos* = law)

Nonsense syllables: Used by Hermann Ebbinghaus in his pioneering studies of associative memory processes. Typically, such syllables are formed by a consonant-vowel-consonant sequence such as MIB, TUJ, etc.

Ontology: The branch of metaphysics addressed to questions regarding real or actual being. Whether or not there are actually existing minds or consciousness or thoughts (as distinct from matter) is an *ontological* question.

Operant: Skinner's technical term for an observable musculo-skeletal movement.

Oral stage: The first stage in Freud's theory of psychosexual development; the stage at which sensual gratification is achieved by oral stimulation, such as sucking.

Ossicles: The three bones of the middle ear which translate motion from the ear drum to the cochlear duct of the inner ear.

Payoff matrix: In general, the costs and benefits of various decisions and decision-strategies; in signal detection theory, the costs assessed against either false alarms or missed targets.

Phallic stage: The stage of psychosexual development when sexual gratification is achieved through genital self-stimulation.

PET scan: The acronym stands for *positron emission tomography*. Radioactively tagged elements are introduced into the blood supply to the brain so that the rate of oxidation in various regions can be monitored in real time, thus providing a record of activity in specific regions.

Pitch: The auditory sensation associated with the frequency of sound.

Physiognomy: The pseudo-science of Lavater, which promised to reveal basic personality and moral characteristics by the close study of facial types.

Pleasure principle: Freud's term for the controlling influence that modes of sexual gratification have on behavior; a principle grounded in the ancestral and instinctual animal pleasures and tied to survival and procreation.

Positivism: A philosophical defense of scientific modes of inquiry as the only source of valid knowledge. The "positive" knowledge of science is contrasted with superstition, religious faith, and untestable intuition.

Psychosexual development: Freud's conception of the maturation of sexuality from the nourishment-based instincts of infancy to adult procreative sexuality; a maturation in which basic instinctual inclinations are "socialized" by the adult community.

Rationalism: A term used somewhat imprecisely to cover various philosophical positions and systems that may have little in common; but generally covering philosophical arguments to the effect that all valid knowledge must be in the form of rationally intelligible and integrated ideas rather than the disjointed facts of bare experience.

Reality principle: As used by Freud, a concept covering the socialization and civilizing of those impulses grounded in the Pleasure Principle.

Receptors: Specialized cells that respond selectively to particular classes of physical or chemical stimuli. The rods and cones of the retina and the hair cells of the inner ear are examples.

Repression: In psychoanalytic theory, the mechanism or process by which unacceptable thoughts and desires are kept out of consciousness and are driven (repressed) into the recesses of the unconscious.

ROC curve: The acronym stands for *receiver operating characteristics* and refers to the performance of a detection system. The curve is a plot of the rate of false alarms against the rate of "hits."

Rods: Receptor cells in the retina, sensitive to the lowest levels of visible illumination but not associated with the color-sensing mechanisms of the visual system.

Schizophrenia: A form of psychosis characterized by hallucinations, delusions, and thought so disordered as to prevent a rational form of life.

Span of apprehension: The maximum number of items that can be kept in immediate memory after a brief exposure. In the absence of special "priming" techniques, this number is on the order of 7 or 8.

Split brain: A term referring to the surgical disruption of pathways that join the two halves of the brain.

Structuralism: In the modern history of psychology, this term was used to describe that program of research and theory devoted to unearthing the structure of mental life; the sensations, images, feelings, and interactions among these giving rise to mental life.

Superego: In psychoanalytic theory, the equivalent of "conscience."

Teleological: An explanation of an event or thing based on the purpose or goal (Gk. = *telos*) achieved as a result of that event or thing. The long neck of the giraffe is teleologically explained when the attribute is connected to the nutritional requirements of the species and the altitude of needed vegetation.

Unconscious: As distinct from non-conscious or the medical sense of "unconscious", the psychoanalytic concept of a dynamic realm of motives and conflicts, outside the reach of consciousness, but shaping conscious behavior.

Unipolar: The form of manic-depressive illness in which mood swings are generally absent and the patient is either in one or the other phase of the disorder. Depression is the more common form of unipolar manic-depressive disease.

Timeline

B.C.

ca.750..................Homer's *Iliad* and *Odyssey*

399..................Socrates chooses death over dishonor

400..................Hippocrates flourishes

367..................Plato founds the Academy

335..................Aristotle founds the Lyceum

322..................Theophrastus succeeds Aristotle as director of the Lyceum

A.D.

180................Galen undertakes research on the nerves in relation to behavior

1579 ....Johann Weyer's *De Prestigiis Daemonum* published

1605................Francis Bacon's *The Proficience and Advancement of Learning*

1609................Galileo observes the moons of Jupiter

1644................Descartes's *Principles of Philosophy*

1687................Isaac Newton's *Principia*

1690................John Locke's *An Essay on Human Understanding*

1789................Jeremy Bentham's *Principles of Morals and Legislation*

1809 ....Franz Joseph Gall's *Investigations on the Nervous System in General and on that of the Brain in Particular*

1835................Weber's Law

1843................John Stuart Mill's *A System of Logic*

1845................Griesinger's *Mental Pathology and Therapeutics*

1856................The first volume of Helmholtz's *Treatise on Physiological Optics*

1859................Darwin's *Origin of Species*

1860................Fechner's Law

1861................Pierre Broca identifies "Broca's area"

1867................Henry Maudsley's *The Physiology and Pathology of the Mind*

1879................Wundt establishes the psychology laboratory at Leipzig

1885................Ebbinghaus's *On Memory*

1890................William James's *Principles of Psychology*

1896................Freud and Breuer publish their *Studies of Hysteria*

1898................E.L. Thorndike's *Animal Intelligence*

1900................Freud's *The Interpretation of Dreams*

1905................Ivan Pavlov gives Nobel Prize address

1905................Alfred Binet and Theodore Simon publish *The Development of Intelligence in Children*

1913................John Watson's "Psychology as the behaviorist views it"

1920 ....Carl Jung's *Psychological Types*

1925................Wolfgang Köhler's *Gestalt Problems and the Beginnings of Gestalt Theory*

1926.................Jean Piaget's *The Child's Representation of the World*

1929 ....Karl Lashley's *Brain Mechanisms in Intelligence*

1932................E. C. Tolman's *Purposive Behavior in Animals and Men*

1938................B. F. Skinner's *Behavior of Organisms*

1948................E. C. Tolman's *Cognitive Maps in Rats and Man*

1954................James Olds publishes *Studies of Reward and Punishment Centers in the Brain*

1956................Solomon Asch's "Studies of independence and conformity"

1959................Noam Chomsky reviews Skinner's *Verbal Behavior*

1963................Lawrence Kohlberg's "Development of children's orientations toward a moral order"

1963................Stanley Milgram, "Behavioral study of obedience"

1972................Jean Piaget's *The Child's Conception of the World*

1973................David Rosenhan's "On being sane in insane places"

Comprehensive Bibliography

Essential Readings

Henry Gleitman, *Basic Psychology* (1992, 3d ed.) New York: Norton.

Daniel N. Robinson, *An Intellectual History of Psychology* (1995, 3d ed.) Madison: University of Wisconsin Press.

Supplementary Readings

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Barnes, J. *Early Greek Philosophy*. (1987) London: Penguin. (The pre-Socratics and the overall intellectual context from which Plato's works would depart and also on which they would depend to some extent.)

Borst, C.V. ed. *The Mind/Brain Identity Theory*. (1970) New York: St. Martin's. (Seminal essays on the mind/body problem by leading thinkers.)

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Coren, S. and Girgus, J. *Seeing Is Deceiving: The Psychology of Visual Illusions*. (1978) Hillsdale, New Jersey: Lawrence Earlbaum (A good "book of illusions," supplemented with explanations and implications for a general theory of perception.)

Darley, J. and Latané, B. "Bystander intervention in emergencies: Diffusion of responsibility". 1968, *Journal of Personality and Social Psychology*, vol. 10, pp. 210-14. (Research on the contextual conditions favoring or discouraging helping-behavior).

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Descartes, René *Discourse on Method* (1637) in vol. I, *The Philosophical Writings of Descartes*. J. Cottingham, et al., trans. (1985) Cambridge: Cambridge University Press. (His "method of doubt," theory of "clear ideas," and cogent criticisms of more traditional modes of inquiry.)

Dray, W. *Laws and Explanation in History*. (1957) New York: Oxford University Press. (A systematic and powerful defense of the claim that historical and social events are not reducible to the sorts of events amenable to scientific explanation; a critique of the nomological-deductive mode of explanation.)

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Erikson, E.H. *Dimensions of a New Identity*. (1974) New York: Norton (The non-Freudian perspective on life's stages and the grounding of its meaning.)

Fechner, G.T. *Elements of Psychophysics* (1860). Helmust Adler, trans. (1966) New York: Holt, Reinhart & Winston (The founding treatise in psychophysics by the scientist who invented the field.)

Flynn, F. ed. *Advances in Behavioral Biology: The neurophysiology of aggression*. (1975) New York: Academic Press (Brain mechanisms subserving emotional behavior, especially the limbic system in relation to aggression.)

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Galileo *Dialogues Concerning Two New Sciences* (1638/1954). Henry Crew and A. de Salvio, trans. New York: Dover. (Incisive, revolutionary, critical, and dazzling as an introduction to experimental physics, the ignorance of the past, the promise held out by the new perspective on science.)

Gilligan, C. *In a Different Voice*. (1982) Cambridge: Harvard University Press (Against Kohlberg's theory, this work argues for an appreciation of the several "voices" in which moral sensibilities find expression; the emphasis on empathy and sympathy over the "logic" of morals.)

Ginzburg, C. *Ecstasies: Deciphering the Witches' Sabbath*. (1991) New York: Pantheon. (The cultures of superstition and punishment regnant in the Renaissance.)

Gleitman, H. *Basic Psychology* (3d ed.) New York: Norton, 1992. (The essential text for the course).

Goldstein, E. *Sensation and Perception* (3d ed.) (1989): Belmont, CA: Wadsworth. (An excellent and comprehensive text on the subject.)

Green, B. & Swets, J. *Signal Detection Theory & Psychophysics*. (1966) New York: Wiley. (The theory of signal detection and its contributions to the understanding of perception and decision-making.)

Hempel, C. *Aspects of Scientific Explanation*. (1965) New York: Free Press. (Essays in defense of the nomological-deductive model of science and replies to critics.)

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Hume, D. *A Treatise of Human Nature* (1739) L.A. Selby-Bigge, ed. (1965) New York: Dover. (One of the most influential treatises in defense of the empirical theory of knowledge.)

Kenny, A. *Aristotle on the Perfect Life*. (1990) Oxford: Oxford University Press. (Aristotle's perfectionist scheme of life and its dependence on the larger context of the polis.)

Kohlberg, L. ed. *The Psychology of Moral Development*. (1984) San Francisco: Harper and Row. (Kohlberg's theory and replies to critics; summaries of major findings, defenses and explanations of the methods.)

Köhler, W. *The Mentality of Apes*. (1927) New York: Harcourt Brace (A classic in the tradition of Gestalt psychology, summarizing studies of insight and problem-solving by the great apes.)

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Robinson, D. *Wild Beasts and Idle Humours: The Insanity Defense from Antiquity to the Present*. (1996) Cambridge: Harvard University Press. (How the law has understood mental life from the time of Homer.)

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Skinner, B.F. *Beyond Freedom and Dignity*. (1971) New York: Knopf (The world as it should be, according to B.F. Skinner; NO PRAISE—NO BLAME!)

Segall, M. et al. *The Influence of Culture on Visual Perception*. (1966) New York: Bobbs Merrill (The "carpentered world" of the West yields perceptual tendencies different from those found in less structured places.)

Shepherd, R. *Mind Sights*. (1990) New York: Freeman (Mental rotation and other rich cognitive events are discussed with insight and suggestively.)

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Wolpe, J. *The Practice of Behavior Therapy*. (1973) New York: Pargamon (The behavioristic approach to defining and treating "neurotic" disorders; Freudians need not apply.)

The Great Ideas of Psychology

Part II

Professor Daniel N. Robinson



THE TEACHING COMPANY ®

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Daniel Robinson is professor of psychology at Georgetown University, where he has taught since 1971. Although his doctorate was earned in neuropsychology (1965, City University of New York), his scholarly books and articles have established him as an authority in the history of psychology, philosophy of psychology, and psychology and law. He holds the position of adjunct professor of philosophy at Georgetown and, since 1991, he has lectured regularly for the sub-faculty of philosophy at the University of Oxford.

Dr. Robinson's books include *The Enlightened Machine: An Analytical Introduction to Neuropsychology* (Columbia, 1980), *Psychology and Law* (Oxford, 1980), *Philosophy of Psychology* (Columbia, 1985), *Aristotle's Psychology* (1989), *An Intellectual History of Psychology* (3rd ed., Wisconsin, 1995) and *Wild Beasts & Idle Humours: The Insanity Defense from Antiquity to the Present* (Harvard, 1996). Dr. Robinson has served as principal consultant to the Public Broadcasting System for the award-winning series "The Brain" and the subsequent nine-part series, "The Mind." He is past president of two divisions of the American Psychological Association: the division of the history of psychology and the division of theoretical and philosophical psychology. He is fellow of the American Psychological Association and of the British Psychological Society. Dr. Robinson is also visiting senior member of Linacre College, Oxford.

The Great Ideas of Psychology
Table of Contents

The Great Ideas of Psychology

Scope

These forty-eight lectures examine the conceptual and historical foundations, the methods, the major findings, and the dominant perspectives in psychology. The subject is vast. The lectures are designed to achieve balance between basic processes and real-life issues; between the "hard science" and "soft science" of psychology; between the personal and the social; between the normal and the deviant.

In addition to a critical review of major findings and theories, the lectures examine several controversial issues arising from or illuminated by psychological research and theory. Included among these are the issue of "nature" versus "nurture"; theories of genetic or behavioristic or biological determinism; theories of moral relativism and absolutism; sex "roles" and gender stereotyping; the place of psychology within the legal system (e.g., in predicting violence, establishing competence, or determining whether or not a defendant is sane).

Although psychology and kindred disciplines help to clarify such issues, the lectures will point to the limitations imposed on any purely scientific or empirical approach to matters of this sort.

Objectives

The student will be able to:

1. Identify the broad historical and conceptual foundations of psychology from its origins in classical philosophy to the present;
2. Identify the major research methods and findings that characterize contemporary psychology;
3. Explain the principal claims and the main points of contention between and among the major schools and systems of psychology, including the behavioristic, the psychoanalytic, the neurocognitive, and social constructionist;
4. Explain the dependence of these issues on the larger framework bequeathed by the history of ideas.

Lecture Thirteen
Watson and American Behaviorism

Scope: Psychology circa 1915 witnessed major contests for supremacy in psychology between and among the schools of structuralism (bequeathed by the Wundtian European tradition), functionalism (advanced by William James and others), and the growing psychoanalytic perspective of the medical psychologists. Against this background a distinctly American alternative was fashioned by John B. Watson, an impatient crusader who was convinced that a scientific psychology must confine itself to observable behavior. Watson's books and occasional research promised to relieve the problems of child-rearing and even larger social problems through a developed and "scientific" psychology. The emphasis was pragmatic, the method experimental, and the perspective non- and even anti-philosophical.

Objectives: Upon completion of this lecture, you should be able to:

1. Describe the major features of the structuralist and functionalist schools.
2. Summarize Watson's polemical writings and studies of infants as well as the chief claims of behaviorism.
3. Summarize how Watson's attachment to the Pavlovian theory proves to be the undoing of his specific brand of behaviorism, but the perspective has already won converts.

Outline

I. In 1879, at the University of Leipzig, Wundt established an experimental laboratory dedicated to psychology. Wundt also established a journal in which the findings were published, as well as general program in which young students could study.

- **A.** The most often-cited Wundt is the Wundt of experimental psychology.
- **B.** The Wundt of agenda B sought to understand human behavior within a particular social and cultural context.
- **C.** At the Leipzig laboratory, Wundt's experimental method was most often introspective, although his method frequently went well beyond introspection. The idea that his method was introspective was advanced primarily by E.B. Tichner.
  1. Tichner's writings were at one time considered authoritative representations of Wundt. More recent research has cast doubt on the degree to which Tichner accurately characterized Wundt.
  2. A Tichnerian structural program begins by laying out the structure of the mind as consisting of basic modules. This is the basis for a more complex psychological inquiry. There were three aspects: sensation, images, and feelings.
  3. The method for the study of these facets of mind, on a Tichnerian account, is through trained introspection.

II. In America at the time there was a competing perspective. This perspective, known as functionalism, is the one most closely associated with William James.

- **A.** James surfaced as the quintessential New England intellectual. He is famous for his pragmatic philosophy.
- **B.** In this vein, James offered a radical empiricism.
- **C.** The question raised by James, within a Darwinian framework, is: "what is consciousness for?" What does consciousness achieve that could not be achieved without it? He offered various answers, one of which was that consciousness serves a regulative function. Consciousness selects items from the external world. The mind is active. In our stream of consciousness, we are able to have personal identity and make choices amidst a complex external world. It is a thus a precursor to behaviorism.

III. John Watson is routinely declared to be the father of modern behaviorism.

- **A.** Watson recognized that the introspective approach would go nowhere. The Tichnerian studies have no relevance to daily life. For Watson, a scientific achievement must allow us to do something that could not have been done before.

B. Watson thus suggested that the subject matter of psychology must be changed. The subject matter of a science must be observable. The proper subject matter of psychology, Watson argued, was behavior.

1. In this regard, Pavlov's model of classical conditioning provided a mechanism for linking behavior to psychological life.
2. The nature versus nurture issue was an empirical question for Watson. This issue is certainly crucial for behaviorism. Watson thus began to study infant behavior at Johns Hopkins. He wanted to argue that personality development involved the merging of the three basic emotional patterns. The balance of the story is made up of environmental conditioning.

Essential Reading:

Daniel N. Robinson, pp. 339-347

Supplementary Reading:

J.B. Watson, *Psychology from the Standpoint of a Behaviorist.* (1919) Philadelphia: Lippincott

Questions to Consider:

1. Explain how behaviorism fits into the Darwinian perspective.
2. Conclude whether all mental events can be reduced to dispositions toward certain types of behavior.

Lecture Fourteen
B.F. Skinner and Modern Behaviorism

Scope: Although written in 1938, B.F. Skinner's *Behavior of Organisms* did not attract wide attention until about 1950 when, in the aftermath of World War II, orientations in psychology were increasingly environmentalistic, practical, and, alas, "un-European." In several books and numerous articles, Skinner made the case for a purely descriptive science of behavior, relying not on Pavlovian mechanisms but on what Skinner himself dubbed "operant" conditioning.

In this lecture the principles of operant conditioning are reviewed, the major findings summarized, and the larger perspective examined. The anti-mentalistic nature of behaviorism is reviewed, as is its "empty organism" independence; i.e., the thesis that a descriptive science of behavior need not wait till the findings from physiology and kindred sciences are available.

Objectives: Upon completion of this lecture, you should be able to:

1. Identify the meaning of such basic terms as "operant behavior," "instrumental conditioning,"and "schedules of reinforcement."
2. Explain the shift in emphasis from the sources of behavior being *inside* to being *outside* the organism.
3. Summarize basic operant conditioning techniques and their main effects.

Outline

I. Skinner sought to establish psychology as a descriptive science of behavior.

- **A.** Ernst Mach took the grounding of every science to be at the level of observation and experiment.
- **B.** Skinner was committed to the Machian perspective in the psychological domain. This would become clear in Skinner's first work, *Behavior of Organisms*. In this work he declared a scientific psychology based on behavior could be independent from physiology, chemistry, and the like.
  - **1.** Throughout the 19th century, influential psychological thinkers tied psychological phenomena to physiological phenomena.
  - **2.** In dealing with this question, Skinner argued that the facts of behavior survive any theoretical construction. Nothing is added to the information of behavior by knowing what is inside the organism, even if there isn't anything inside the organism at all.

II. A purely descriptive science of behavior must be lean in its terminology, avoiding the use of private, mentalistic terms. To avoid the use of mentalistic terms, one may adopt operational definitions. For instance, one can define hunger as hours of food deprivation. The determinants of behavior, from Skinner's perspective, are external to the organism.

- **A.** Operational definitions allow for the translation of previously psychological terms.
- **B.** This can be overdrawn. For instance, love was operationally defined as hours together, which is patently untenable.

III. Picking up on studies done by Thorndike and his Law of Effect, Skinner offers his own theory of reinforcement. The Pavlovian model, according to Skinner, was the wrong model for understanding behavior.

- **A.** Skinner developed the Skinner box as a way to test the effects of reinforcement on behavior.
- **B.** There are several possible schedules of reinforcement for an organism.
  - **1.** A reinforcer, as defined by Skinner, is anything that alters the probability of a given behavior.
  - **2.** One can continuously reinforce an organism by giving the organism a reinforcer each time the response is given.
  - **3.** There are also fixed ratios and fixed interval schedules of reinforcement.
  - **4.** The most interesting schedule of reinforcement is the variable ratio schedule. The number of responses required to receive a reinforcer trial-to-trial varies. On this schedule, one can elicit "gambling

behavior." The organism will provide the response indefinitely. Nothing in the acquisition of the conditioning provides a cue about which response will yield a reinforcer.

5. Similarly, after relatively few avoidance conditioning trials, the organism will give an indefinite response.

Essential Reading:

Henry Gleitman, pp. 77-98

Daniel N. Robinson, pp. 339-352

Supplementary Reading:

B.F. Skinner, *Science and Human Behavior*. (1953) New York: Macmillan

B.F. Skinner, "Can psychology be a science of the mind?" 1990, *American Psychologist*, vol. 45, pp. 1206-10.

Questions to Consider:

1. Explain whether there is a role for introspection in the Skinnerian scheme.

2. Conclude to what extent the limitations of operational definitions demonstrate limitations to the behavioristic perspective.

Lecture Fifteen

B.F. Skinner and the Engineering of Society

Scope: Skinnerian behaviorism, as developed in the novel *Walden Two* and in *Beyond Freedom and Dignity*, came to be a program of social and institutional reform. Skinner and his disciples held that society was to be understood as a system subject to shaping, its problems finally being understood as behavioral. Thus did behavioristic psychologists propose new modes of instruction in the schools ("programmed" learning, teaching machines, etc.) and new modes of psychological therapy ("behavior modification").

Objectives: Upon completion of this lecture, you should be able to:

1. Describe the larger agenda of behaviorism through a review of Skinner's *Walden Two* and *Beyond Freedom and Dignity.*
2. Outline Skinner's practical, behavioral "engineering" approach in the context of therapy and of classroom education.

Outline

I. Skinner's behaviorism is not merely a descriptive science of behavior, but a means by which to engineer society in certain ways.

- **A.** Skinner was confident that child-rearing is simply a more complex form of operant conditioning. Thus, the issue of behavioral control is already settled.
- **B.** For Skinner, the notion of autonomy is simply superfluous romanticism.
- **C.** In some respects, the environment certainly plays a formative role through "incidental reinforcement" and the like, as reinforcement occurs all the time. However, reference to the environment is certainly not exhaustive.

II. Skinner would argue that suggesting societal reform is simply suggesting that behavior must be reinforced differently. On a Skinnerian account, all social problems are simply problems in reinforcement.

- **A.** Studies of catatonic schizophrenia have strongly spoken for the power of adjusting reinforcement.
- **B.** If catatonic schizophrenia is a genetic condition, behavior merely covers up the problem, rather than addressing it.

III. In Skinner's *Beyond Freedom and Dignity*, which was an extremely controversial work, he offered the following phrase with regard to human moral autonomy: "no praise, no blame."

- **A.** Skinner meant that there is no extraordinary inner strength and virtue in the hero. Instead, the determinants of these particular behaviors are in the environment. Thus there are no moral grounds for praise or blame at all.
- **B.** According to Skinner, the question of human behavior and dignity should never be brought up. The question is one of environmental reinforcement, not internal character. Our ethical standards are simply reflective of a particular reinforcement history.

Supplementary Reading:

B.F. Skinner, *Beyond Freedom and Dignity.* (1971) New York: Knopf

Questions to Consider:

1. Conclude whether Skinner's thesis can be regarded as a deterministic thesis.
2. If Skinner's arguments are correct, would they entail a world without objective values and, if so, what would life in such a world be like?

Lecture Sixteen

Language

Scope: Skinner recognized that, of all the features of human psychology that a developed behaviorism must explain, *language* presents the greatest challenge. In his *Verbal Behavior*, he argued strenuously that this distinctive human activity is merely another form of behavior, shaped by the same reinforcing operations and subject to the same modes of investigation as any other behavior.

In his review of this work, however, Noam Chomsky outlined what he took to be the fatal flaws in this understanding of the nature of language. In the process, Chomsky added to a literature of data, criticism, and theory leading away from behaviorism and toward a more "cognitive" psychology grounded in the larger system of thought that is rationalism.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize language as "verbal behavior."
2. Explain the complex nature of the very concept of "language" and the problems of definition.
3. Identify the relationship between theories about the origins of language and the anthropological and clinical data that favor or oppose various theories.

Outline

I. If behaviorism is to succeed as a comprehensive psychology, it must account for language. To demonstrate that language is merely another form of behavior governed by a particular reinforcement history, Skinner wrote *Verbal Behavior*.

- **A.** The word-like utterances of infants are strongly reinforced by the parents; thus a kind of imitative behavior is being reinforced.
- **B.** On Skinner's account, babies engage in other imitations, and ultimately language is developed.

II. How is language to be defined? How one defines language will certainly bear upon the extent to which behaviorism can account for language.

- **A.** Denotative terms have ostensive definitions.
- **B.** Language also has connotative terms that are embedded in a particular meaningful context. One example of a connotative term is "justice."
  - **1.** The question of whether non-human animals have language depends on whether or not part of the requirement of having a language is the maintenance of connotative terms, because it is doubtful whether or not this can be said of any other species in the animal economy.
  - **2.** Do infants have language? One is in the bind of determining whether the infant is performing with a purpose or performing for a purpose. This is not evident from the external behavior.
- **C.** Locke had a conventionalist notion of language. The denotation of terms, he held, can only be conventional. Languages are formed, on this account, conventionally. Language is essentially a cultural affair. This represents an empirical perspective on language.
- **D.** In the eighteenth century, Thomas Reid questioned the conventionalist account. He argued that for there to be an artificial language, there has to be a basic natural language in place. Without a natural language it would be impossible to establish artificial conventions.

III. Noam Chomsky offers the most famous version of an innate theory of language, which decisively refutes the behavioristic theory of language.

- **A.** Linguistic reinforcement histories vary culturally. Nonetheless, the age at which children begin to form grammatically coherent sentences is relatively the same the world over.
- **B.** Chomsky also argued that parents do not reinforce grammar, but only content. If it is the case that grammar is not reinforced, then behaviorism cannot explain why children formulate grammatically correct sentences.

C. Language is creative. Ideas can be expressed in a variety of different ways, all of which can be understood even if never heard before. This does not match up with the behavioristic scenario, because these behaviors could never have been reinforced.

D. The age at which children can follow verbal instructions is far earlier than the age at which children can produce those sentences. What must the operant conditioning history be in order for that to be the case?

E. On rare occasions, children have been reared in a linguistically deprived environment. These children, known as feral children, may never learn a language if language training is not begun soon enough. Thus, there is a critical period for language use. This does not match up with behaviorism, because on that account, it should not matter when one begins the reinforcement.

IV. All of this suggests that language is best understood as a kind of internal process, not as a function of a reinforcement history. On Chomsky's account, the innateness of language is given by the structural-functional make-up of the human organism.

Essential Reading:

Henry Gleitman, Chap. 8

Supplementary Reading:

Noam Chomsky, *Reflections on Language* (1975) New York: Pantheon

Questions to Consider

1. Conclude whether the phenomenon of universal grammar is best understood as a genetic endowment.
2. Explain the critical period for language development.

Section Three: Psychology in the Rationalist Tradition

Lecture Seventeen

The Integration of Experience

Scope: Although the empiricist perspective accounts for much of what comes to be known and thought, and much upon which behavior depends, there is a long tradition based on a different set of suppositions—namely, that for experience itself to take place there must be in place basic principles of organization and categorization. The complexities of life facing most of the developed species are such that survival requires more than a passive absorption of otherwise disconnected stimuli. Rather, the organism must be constituted so as to organize experience into meaningful ensembles, rejecting what is superfluous and giving special significance to features of the world that bear upon life's necessities.

The "rationalist" tradition is itself a various one, featuring not only theories about rationality but also theories about meaningfulness, intelligibility, and coherence. The "experiences" referred to by empiricists are inevitably *about* something and must be integrated with still other experiences to yield meaningful and intelligible "wholes." This is the general orientation of Gestalt psychology, one of the systematic psychologies generally opposed to the behavioristic perspective and nurturing of essentially cognitive alternatives.

Objectives: Upon completion of this lecture, you should be able to:

1. Define the several senses of *a priori* or "innate" as regards principles of perceptual organization.
2. Explain the need for the integration of experience into meaningful wholes.
3. Summarize the modern history of Gestalt psychology, its major architects and principles.
4. Identify the major principles of Gestalt psychology as revealed in studies of apparent motion, perceptual grouping, "goodness," "closure," etc.

Outline

I. There do seem to be innate processes without which experience itself would be unintelligible.

- **A.** For Kant, there have to be innate notions of time and space. Without these pure intuitions, experience itself is not possible. Temporal and spatial frameworks are logically prior to experience.
- **B.** Gestalt psychology draws much from Kant's *a priori* intuitions.
  1. The Gestalt psychologists rejected the idea that the right way to understand the mind is by breaking it down into elementary components.
  2. As an alternative, Gestalt psychologists take a given mental experience as a whole experience, which cannot be captured by breaking the experience into more basic parts. One example of this in Gestalt psychology is the "phi phenomenon," in which apparent movement is produced by lights in a row flashing on and off consecutively.
  3. On a Gestalt account, what we perceive is very much what we expect to perceive. This is demonstrated by reversible figures. If there are ambiguities in the scene, the perceptual system imposes coherence onto the scene.

II. Perception is governed by internal notions, not just by the external stimulus. The percipient is active.

- **A.** Stimuli that stand in a certain spatial relation to one another are grouped according to that relationship. This is the Gestalt principle of grouping.
- **B.** Other principles include the principle of simplicity and the principle of closure.
- **C.** Franz found that infant perception is grounded in such organizational principles. This suggests that the visual system of the infant is tuned to pick up particular stimuli.

III. Köhler is probably the most preeminent Gestalt psychologist. He studied the great apes, his favorite of whom was Sultan.

A. Köhler would set up several problem-solving tests for Sultan. On each trial Sultan would at first appear perplexed and frustrated and then, as if through a sudden realization, would come up with the solution to the problem.

B. There was no external trial and error, but rather a sudden insight. This phenomenon poses a great difficulty to the behavioristic perspective. Humans have a similar experience, characterized by the statement, "It just dawned on me."

C. Köhler regarded this type of problem-solving as insightful behavior.

D. Does this defeat behaviorism? It is certainly a severe criticism of rigid behaviorisms, but there are certain tenets of behaviorism which are significant and untouched by Köhler's findings.

IV. These findings suggest that our physiological resources are pre-wired in order to allow for the survival of infants.

A. Often the claim that the brain is pre-wired is confused with the brain being hardwired. That the brain is pre-wired does not mean that the system is inflexible, only that the system is predisposed to particular tendencies. If the environment does not afford the utilization of particular tools, these aspects of the system begin to atrophy.

B. Studies of neo-natal organisms suggest that certain cells are disposed to respond to particular inputs, based on what that species has encountered in its environment throughout its evolutionary history.

Essential Reading:

Henry Gleitman, Chap. 5

Daniel N. Robinson, Chap. 8

Supplementary Reading:

W. Köhler, *Gestalt Psychology* (1947) New York: Liveright.

Questions to Consider:

1. Explain, according to Kant, the origins of "pure intuitions." Can they simply be explained by reference to genetics and physiology?
2. Conclude whether pattern recognition is better accounted for by top-down or bottom-up processing.

Lecture Eighteen
Perception and Attention

Scope: Far from being captured by the "camera" model, the nature of perception is best represented as a transaction between the percipient and the observable world. One not only sees what is "out there," but one sees what one is looking for, has an interest in, or has had earlier and meaningful experiences of. The act of perception is not indifferent but selective.

Selectivity is achieved in two quite different ways, each being a form of filtering. One form of filtering is fixed, and it is determined by the very structural and functional features of the sensory systems themselves. The human visual system, for example, responds to wavelengths only in the range of 360 to 760 nanometers, whereas, for the honeybee, the region of greatest sensitivity is in the ultraviolet. Then there is selective filtering, which is achieved by way of attention, memory, and learning. In a room filled with people speaking, with music playing, with the sounds of doors opening and closing, etc., one can have a conversation with another, hearing only what the other is saying and "filtering out" the rest. But in that very setting, should one's own name be mentioned, even across the room, one becomes immediately aware of it. Then, too, studies have shown that specific cells in the brain are "tuned" to the distress-cries of the species. Both experience and evolutionary pressures equip percipients with processes of selective attention that make it far easier to manage the flood of stimuli arriving at every instant.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain the difference between fixed and selective filtering.
2. Describe the dynamic and interactional nature of perception as opposed to the "passive recipient" or "camera" model.
3. Summarize how both natural selection and learning provide the means by which certain stimuli gain privileged entry into awareness as other stimuli are simply filtered out.

Outline

I. The external world provides a veritable bath of stimulation upon an organism. Filtering mechanisms are required in order to keep out extraneous stimuli. The mechanisms of perception are governed by passive filtration.

- **A.** The frequency of radiation that hits the retina determines the retinal response. We do not respond to all wavelengths of light. No matter what the range of the radiation might be, only a portion will be visible.
- **B.** The auditory system presents another sort of passive filter. It can respond effectively to particular sonic frequencies, but not to all frequencies. This is what one looks for in any playback system. For example, the human eardrum is rigidly mounted to pick up only frequencies in the audible range.

II. Another part of the external world is filtered out through a process of active filtering. We are able to filter things out selectively, depending upon learning and innate endowments.

- **A.** By means of the aforementioned "cocktail party" effect, one can filter out surrounding conversations and focus on the particular conversation in which one is engaged. The "cocktail party" effect is not intentional; it is done quite automatically. Also, if something in the ambient acoustic environment is meaningful, the "cocktail party" effect allows the individual to pick it up.
- **B.** The mechanisms requisite to perform active filtering are present in the neo-natal environment.
- **C.** Other studies of a more basic psychophysical nature have been done to determine whether or not we can pick out what we are supposed to hear. Such studies often require dichotic listening.
  1. When the subject is asked to repeat back a message, in a shadowing task, she is able perform very well.
  2. Often, during the shadowing task, if a message is played on the other side, the subject cannot identify that something was played on the other side. When she knows that something was played, she will almost never be able to identify it.

3. During a very high information-loading shadowing task, not only do errors increase, but if brain activity is measured, there will be very little response in the brain to the sound being played in the off ear. The brain responses are sharp in a very easy shadowing task.
4. Why is there no cortical response? Somewhere in the auditory nervous system, a mechanism for attention prevents the signal from reaching the cortical level. This probably occurs at the thalamic level.

Essential Reading:

Henry Gleitman, Chap. 5, especially pp. 155-57.

Supplementary Reading:

M. I. Posner & S. E. Petersen, "The attentional system of the human brain." 1990, *Annual Review of Neuroscience*, vol. 13, pp. 25-42.

Questions to Consider:

1. Identify the place of the "cocktail-party effect" in a broader evolutionary scheme.
2. Explain how eye movements could be used to demonstrate perceptual selectivity.

Lecture Nineteen

Cognitive "Maps," "Insight," and Animal Minds

Scope: To speak of "selective" attention as grounded in what is meaningful to the percipient is to point to some means by which features of the external world come to be represented within the realms of awareness or mental life. As anyone who has studied animals in their natural habitats knows, such processes or achievements are widely represented in the animal kingdom. The behavioristic commitment to scientific "objectivity" has often been invoked to challenge what is called the *anthropomorphic* form of explanation; i.e., explaining what non-human animals do in terms drawn from human experiences. Expectant human mothers buy clothing and blankets in anticipation of the needs of the offspring, and robins build nests. It would be "anthropomorphic" to describe the latter as a form of conscious, maternal concern.

Nonetheless, some forms of problem-solving displayed by non-human animals strongly suggest mental representations of the sort that adult human beings display. E.C. Tolman's studies of *latent learning*, Wolfgang Kohler's studies of *insight*, and Karl Lashley's studies of *transposition* are representative of the rich cognitive abilities found among non-human animals. The seeds of the "cognitive revolution" were sown in research of this kind.

Objectives: Upon completion of this lecture, you should be able to:

1. Identify "anthropomorphic" explanations and the scientist's wariness toward it.
2. Summarize the behavioristic opposition to the notion of "mental" states, and the commitment to explain behavior in terms of environmental events; i.e., those occurring outside the organism.
3. Describe specific studies by three cognitively oriented theorists who examined performances not easily reconciled to the claims and perspective of behaviorism.

Outline

I. The issue of mental life in animals is the issue of anthropomorphism.

- **A.** Darwin's evolutionary model suggests that our psychological processes are quantitatively, not qualitatively, distinct from the psychological processes of non-human animals.
- **B.** As far back as Aristotle, anthropomorphic explanations have been asserted.
- **C.** When the philosophical critique of science hit its stride, all disciplines that identified themselves as scientific sought to eliminate philosophy. Ernst Mach, for example, questioned whether human mental language should be used to account for the behavior of non-human animals.
- **D.** Romanes was highly influenced by Darwin's continuity theory. He cautioned against reverse anthropomorphism, warning that removing all anthropomorphic terms from explanations involving non-human animals removes the explanation itself.
- **E.** In response to Romanes, C. Lloyd Morgan offered Lloyd Morgan's maxim, similar to Occam's Razor and taken from Mach. It posited that one should not assume anthropomorphic characteristics in order to explain non-human animal behavior.

II. E.C. Tolman of the University of California at Berkeley did various studies on animal performance. He would wheel rats in a wheelbarrow through a maze about as many times as it took rats who ran the maze to learn the maze. He found that the rats wheeled through the maze would solve the maze almost instantaneously when they allowed to run the maze.

- **A.** No motor activity was required to learn the maze, contrary to what would be predicted by an utterly mechanistic behaviorism.
- **B.** Similarly, a rat that had learned to run the maze could also swim the maze. This is certainly an embarrassment to a rigid mechanistic behaviorism.
- **C.** If the rat is taken out of the maze and a cover is placed on the maze, the rat would run in a straight line to the goal box. The rat would not mechanistically follow the learned twists and turns in the maze.
  1. The rat just knows where the goal box is because it has formed a cognitive map.

2. On this account, learning is simply the formation of the proper representation.

D. Another experiment involved food-deprived rats that had been previously placed in the maze and showed no learning. When these rats were placed in the maze in a food-deprived state, they would very quickly reach the error rate of rats that had been running the maze for food. Tolman regards this as latent learning and distinguishes between learning and performance. Learning occurs, but a reinforcer is required for performance.

E. Studies of mental rotation corroborate Tolman's idea that there is internal representation of external environments.

Essential Reading:

Daniel N. Robinson, pp. 352-58

Henry Gleitman, pp. 98-104

Supplementary Reading:

Wolfgang Köhler, *The Mentality of Apes*. (1927) New York: Harcourt Brace

E. C. Tolman, "Cognitive maps in rats and man." 1948, *Psychological Review*, vol. 55, pp. 189-208.

R. N. Shephard, *Mind Sights*. (1990) New York: Freeman

Questions to Consider:

1. Explain how a cognitive theorist could account for the plethora of evidence that learning results from a stimulus-reinforcer pairing.
2. Evaluate anthropomorphism from the perspective of Darwinian evolution. Would it make sense to speak of mentation in non-human animals?

Lecture Twenty

Memory Revisited: Mnemonics and Context

Scope: To speak of cognitive "maps" is to refer to some sort of mental or neurological representation of the external world available to the organism after the stimuli have been removed. As noted in Lecture Eleven, well-rehearsed stimuli (e.g., one's date of birth or street address) may continue to be represented for a lifetime, whereas some events are forgotten moments after they have been seen or heard. The "filtering" referred to in Lecture Eighteen includes such passive processes as the gradual fading from memory of items that have not been well-rehearsed.

But recollection and forgetting are not always passive processes. The so-called "span of apprehension" (Lecture Eleven) suggests a lower limit on memory-capacity, but this limit is readily exceeded when one is able to employ cognitively meaningful *mnemonics*—aids to memory based on various principles.

Moreover, the vividness with which something is recalled depends very much on the overall context within which it was first confronted. In the early medieval period, an age before contacts were common, it was customary to give young children sweets and other presents as they witnessed a transaction, such that all their lives they would recall the moment. (Sometimes they were dunked in hot water for the same purpose!) In all, then, whether and how much of an event is remembered depends not simply on the passage of time but on such cognitively relevant factors as context and meaningfulness; on the extent to which the event was incorporated into a cognitively meaningful and coherent framework. Further, there is a strong cognitive tendency to create such meaningful frameworks and to force information into them. This is one basis on which memories can be pseudoreminiscences: The person has created a kind of narrative which the "facts" must later honor, as the game "telephone" readily illustrates.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain how cognitive factors serve to enlarge powers of storage and recall against the background of the empiricistic trace-theory of memory offered in Lecture XI.
2. Identify several mnemonic devices.
3. Explain the role of context as a powerful factor in the permanence of memories, and the meaning of "context" in essentially cognitive terms.

Outline

I. Memory functions within a context. The significance of a memory, for example, affects the degree to which the memory can be recalled.

A. Medieval folk psychology recognized that the contextual vividness of a memory can ensure that a memory will be recalled.

B. Flashbulb memories are unique instances in which an event experienced with unparalleled vividness can be remembered in extraordinary detail even after long stretches of time.

C. This phenomenon is a two-way street. For example, in cases of eyewitness testimony, where observations were made under emotionally charged conditions, false memories may be created. The event is absorbed in a larger narrative framework, and thus the associated memories reflect such biases and suppositions.

II. We use mnemonic devices in order to organize our memories.

A. We remember better those events that we can incorporate into a narrative account. Thus, there is something cognitive that underlies memories. Memories are not simply impressions.

B. Preliterate societies face this problem at far greater levels.

1. In the ancient Greek world, epic poetry served as a living memory. In such a narrative form, a substantial amount of information can be represented.
2. Of course, the narrative framework risks converting the memories of events into something that is untrue. This danger is demonstrated in the "telephone game." These narrative frameworks are constructivist in nature, in which the blanks are filled in by expectations.

III. Constructivist narratives are dangerous in a courtroom setting in which reconstructed memories result in the conviction of innocent individuals.

IV. Because memory relies upon physiological resources, it is subject to disease. The case of Clive Wearing is illustrative in this regard. After a severe case of encephalitis, Clive Wearing's memory will not go back beyond a minute or a minute and a half. He searches for his own mind minute by minute. He does, however, remember his love for his wife and is still able to play the piano extraordinarily. The coding for memory is overwhelmingly complex, and the modes of representation are various.

Essential Reading:

Henry Gleitman, Chap. 6

Supplementary Reading:

Ulrich Neisser, *Memory Observed.* (1982) San Francisco: Freeman

Elizabeth Loftus, *Eyewitness Testimony* (1989) Cambridge: Harvard University Press

Questions to Consider:

1. Explain how a limited "span of apprehension" would be accounted for physiologically.
2. Contrast the merits and deficiencies of different models for how memories are encoded and retrieved.

Lecture Twenty-One
Piaget's Stage Theory of Cognitive Development

Scope: The selectivity of memory and the assimilation of experiences to an ever larger and more complex context of meanings are aspects of thought—of cognition—found as early as early childhood. It is apparent in the play of children, a fact that was not lost on James Sully late in the nineteenth century. The most influential theory of cognitive development in the twentieth century, though one not without its critics, is that advanced by the Swiss psychologist Jean Piaget. According to Piaget, the forms of thought develop in stages, each later stage building on the achievements of the preceding one. During development, each stage must be passed in order; eacj stage permits the solution of a given genre of problems but not those calling for more complex cognitive processes.

The earliest stage of cognition in the infant and very young child is one of sensory-motor integrations: coming to understand one's own movements as affecting the external world, and thus coming to recognize oneself as distinct from the external world. The child is able first to perform concrete operations (such as simple arithmetic) on objects in the world, and ultimately formal operations by which the world can be represented abstractly (as, for example, in the neutral symbols of algebra). Tests of such concepts as *object permanence*, *universals*, and *conservation* reveal the underlying "logic" of thought.

Objectives: Upon completion of this lecture, you should be able to:

1. Describe the early work of Sully, who was much influenced by Darwin, and whose studies of childhood were foundational.
2. Explain Piaget's multi-stage theory of cognitive development, with illustrations of the problems solved at each stage.
3. Explain certain criticisms and limitations of the theory.

Outline

I. Contemporary psychology is indebted to the Darwinian framework. Evolutionary theory places a large emphasis on development.

- **A.** Darwin made naturalistic observations of infants similar to those that he made of the balance of the animal kingdom.
- **B.** In his *Studies of Childhood*, Sully made perhaps the earliest systematic observations about infant development.

II. Piaget offers a stage theory of cognitive development.

- **A.** As a stage theory, it emphasizes qualitative changes in cognitive faculties as the organism develops.
- **B.** Central to Piaget's theory is the concept of a schema. A schema constitutes the unit of knowledge. It is the building-block of complex knowledge and comes about on the basis of experiences in the infant's life.
  - **1.** The infant can assimilate new experiences into its existing schemata. This is a kind of generalization.
  - **2.** Similarly, the infant must be able to accommodate environmental factors that cannot be assimilated into existing schemata. The infant must be able to formulate new schemata.
- **C.** The earliest stage in Piaget's theory is the sensory-motor stage. At this stage, there is virtually nothing of internal representations of objects not present in the infant's direct environment. This period lasts until about two years of age. At the end of the sensory-motor stage, the first signs of object permanence are introduced.
- **D.** The second stage is the pre-operational stage, which is divided into two sub-stages. The first lasts until age four and the second until age seven.
  - **1.** In the first sub-stage, there is evidence that thinking can be done in terms of representational images. The concept of conservation is not acquired until the concrete operation stage of development.
  - **2.** In the second sub-stage, the resources of language become fully available to the child.

E. In the concrete operations stage, problems such as conservation are quite trivial. This is a qualitative increase in the cognitive resources of the child. At this stage, the child can handle certain basic logical features of objective reality, but cannot handle abstract logical operations. The concept of necessity is not available to a child at this stage.

F. At the next stage—that of formal operations, which begins around age 11 or 12—the child becomes capable of solving abstract logical problems.

III. In assessing Piaget's developmental theory, some behaviorists have suggested that cognitive changes are merely the result of reinforcement histories. The degree of generalization, however, which occurs for a given task at a particular stage, such as conservation, severely undermines the behavioristic criticism.

IV. There are also criticisms suggesting that Piaget underestimates the cognitive faculties of infants. The study of the apparently floating box is such an example.

Essential Reading:

Henry Gleitman, Chap. 13

Supplementary Reading:

Jean Piaget, *The Language and Thought of the Child.* (1955) New York: Meridian Books

Questions to Consider:

1. Conclude whether Piaget's theory of cognitive development is a nativistic theory.
2. Explain what difficulties arise in attempting to assess cognitive capabilities.

Lecture Twenty-Two
The Development of Moral Reasoning

Scope: Building on the research and theory of Jean Piaget, the Harvard psychologist Lawrence Kohlberg devoted a lifetime to the study of moral thinking in children and adults. He expanded Piaget's story-telling technique so that moral dilemmas could be adapted to different age-groups and different cultures. In each story, the listener is called upon to judge whether the actions performed by the characters are right or wrong; why they are right or wrong; whether certain of the actions warrant punishment, and the like.

Based on numerous studies, including those conducted within prisons, Kohlberg concluded that there are definable stages of moral reasoning, from the lowest, based solely on expectations of reward or punishment, to the highest, in which persons frame their own authentic moral standards and judge accordingly.

Kohlberg's theory has been controversial, and it has been challenged by, among others, Carol Gilligan, whose *In A Different Voice* compares men and women in their approaches to Kohlberg-type dilemmas. Gilligan concludes that women tend to by less analytical and more sympathetic, able to adjust judgments to meet the contextual demands of the situation.

Objectives: Upon completion of this course, you should be able to:

1. Explain Piaget's early work on the moral judgments of children and their movement from *heteronomous* to *autonomous* moral thought.
2. Describe Kohlberg's development of the story-telling technique.
3. Outline the different stages of moral reasoning.
4. Summarize criticisms of the theory and alternatives such as Gilligan's.

Outline

I. What is a morality?

- **A.** The moral theory which is probably most commonly applied is one or another version of utilitarianism. An act's moral value is assessed by the way in which the act affects the community.
  1. In a quite raw form, Bentham offered a utilitarian framework according to which a good action is one that brings pleasure.
  2. Mill refined Bentham's hedonistic utilitarianism by distinguishing between higher-level and lower-level forms of happiness.
- **B.** One must be careful with a utilitarian framework, because it can result in a kind of awkward calculation.
- **C.** Deontology is offered as an alternative to consequentialism. Kant's categorical imperative in its first formulation is the quintessential deontological tenet. It goes as follows: act in such a way that the maxim of your action would be instituted as a universal law.
- **D.** Another version of the categorical imperative is that a person should never be used as a mean, but always as an end in herself.
- **E.** In the seventeenth and eighteenth centuries, "sympathy" theories were abundant. These theories argue that our sentiments toward particular actions are the determinants of the moral status of those actions.

II. Psychology should certainly have a role in moral discourse, because morality is a central part of the mental domain. In this regard, Kohlberg made a significant contribution to psychology.

- **A.** Kohlberg adopted a method that had been introduced by Piaget. He would tell a story of a child doing something and then the child was asked to give her assessment as to whether the act was right or wrong.
  1. Piaget discovered that up to a certain age, children base moral evaluations on whether the person who committed the act was rewarded or punished. Older children give far more complex assessments.
  2. Piaget thus made a distinction between heteronomous and autonomous moral reasoning.

B. Kohlberg's multiple stage theory of moral development was far more complex and discriminating than that of Piaget.

1. Very young children make heteronomous moral judgements.
2. At a slightly older age, a child will defer to authority figures for moral judgements.
3. Still older children will make moral evaluations in relation to one's peer group.
4. At the next stage, more sophisticated moral reasoning is apparent. Moral judgements are constitutional in nature; they regard law and civic order as dispositive.
5. In the final stage of moral development, ethical maxims and principles guide moral evaluations. This is an instance of truly autonomous moral reasoning.

C. Carol Gilligan argued in response to Kohlberg that there are gender differences in moral reasoning.

Essential Reading:

Henry Gleitman, Chap. 14

Supplementary Reading:

Carol Gilligan, *In a Different Voice*. (1982) Cambridge: Harvard University Press

Lawrence Kohlberg, ed. *The Psychology of Moral Development*. (1984) San Francisco: Harper and Row.

Daniel N. Robinson, ed. *Social Discourse and Moral Judgment*. (1989) San Diego, California: Academic Press

Questions to Consider:

1. Conclude whether the stages of moral reasoning necessarily match-up with conduct.
2. How might we explain the moral reasoning of individuals who do not fit Kohlberg's scheme?

Lecture Twenty-Three
Knowledge, Thinking, and Understanding

Scope: The ancient Greek philosophers distinguished between and among three forms of thinking or understanding. Those who possessed what might be called scientific knowledge of things were said to have *episteme.* Knowing that all triangles contain 180 degrees or that water is vaporized at a given temperature is illustrative of this form of knowledge. But one having this form of knowledge might nevertheless be unable to solve complex social and political problems; such problems call for a form of practical reasoning which the Greeks dubbed *phronesis*. But neither the person possessing scientific knowledge nor one with highly developed practical reasoning is necessarily a thoroughly wise person, for the most subtle form of wisdom (which in the Greek is *sophia*) is reserved for the truly exceptional great teachers. What has psychology to say about all this?

Problem-solving is at once a practical and a theoretical matter. People skilled at problem-solving know how to reformulate problems so as to make them ever more tractable. Good thinking—if by this one means thinking that actually "sees through" a difficulty and reaches a solution—often depends on finding the right heuristic: the right device, code, or converter for identifying the type of problem one is dealing with and, therefore, the right general solution for that problem. The rules of arithmetic provide a simple heuristic. The rules of syllogistic reasoning offer yet another way of determining whether or not conclusions are validly drawn from the major and minor premises of an argument.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain how all forms of knowledge are not the same, and that some problems call for abilities that might be quite useless in dealing with other problems.
2. Identify the good problem-solver as one who can correctly classify or categorize the type of problem at issue, and who can then find the right heuristic for a problem of that sort.
3. Outline how the ability to shift frameworks and to see problems in new light often yields quick solutions to what might otherwise seem impossibly difficult.

Outline

I. The ancient world provided the foundations for issues that are the subject matter of modern cognitive science.

- **A.** The ancients had a tripartite division of knowledge. *Episteme* was the term for scientific knowledge. A person knowledgeable in practical affairs had *phronesis*. Then there is the knowledge held by wise persons. The Greek word for knowledge as a kind of wisdom is *sophia.* Modern psychology is usually concerned with the first two forms of knowledge.
- **B.** The ancients sought to understand upon what basis we can engage in various problem-solving strategies.
  1. In the *Meno*, Plato offers his nativistic account of knowledge. Socrates can demonstrate to Meno's slave the Pythagorean theorem without providing him any answers. In Platonic terms, Meno's slave *recollects* the theorem; he is led to the answer by Socrates.
  2. Aristotle offered a much more practical account of human problem-solving abilities. He distinguishes two different modes of knowing. There is knowing how, a conceptual understanding, and knowing that, knowing only in a particular instance.

II. Often we use heuristic devices to aid in problem-solving. The trick is to maintain flexibility within a useful heuristic system.

- **A.** In a representative heuristic, we take an object to be part of a given class based upon characteristics that we often associate with members of that class.
- **B.** It is generally the case that a noun-verb-noun sequence represents a causal sequence. This heuristic governs our communications and our interpretations of others' communications.
- **C.** Advertisers have a way of taking advantage of our buying heuristics, etc. Cash discounts are one example.

III. Algorithms are devices that will always give a correct answer if there is a correct answer.

A. A quite conventional algorithm is an English-French dictionary.

B. The rules of arithmetic are also a system of algorithms.

C. The trick, of course, is to determine whether or not the problem is computable. Turing developed a way in which to test whether an arithmetic problem is, in principle, computable.

D. Functional fixedness represents the problem of applying a problem-solving rule to an entirely unrelated context.

 1. This often results from the availability heuristic; we apply the heuristic most available to any situation, regardless of the context.

 2. One can see the trouble this can get us into in the case of whether the sun revolves around the earth or vice versa. Everyday discourse expresses itself in the Ptolemaic view of the relationship, despite the fact that we know otherwise.

IV. Functional fixedness traps us into a view of the universe that is often deceiving.

A. In order to solve the match-stick problem, one must conceive of the layout in three dimensions, not in two dimensions.

B. Newton offers another compelling example of this phenomenon. With all of the apples falling, why doesn't the moon, an object of great mass, fall? Thus, he saw mass as being the grounding for the property that allows the moon not to fall, i.e., its greater gravitational force and its greater distance from the earth.

Essential Reading:

Henry Gleitman, Chap. 7

Supplementary Reading:

K. Dunker, "On problem solving." 1945, *Psychological Monographs*, No. 270, 113 pp.

Questions to Consider:

1. Explain whether all human knowledge takes an algorithmic form.
2. Explain why heuristics are often over-generalized.

Lecture Twenty-Four

Comprehending the World of Experience—Cognition Summarized

Scope: We can now summarize the range of findings and theories that provide the foundation for what has been called "the cognitive revolution." Against what was the "revolution" waged? Chiefly, against highly empiricist and anti-mentalistic psychologies of the sort defended by leading behaviorists. More generally, the revolution was waged against various reductionistic theories in psychology that sought to reduce complex mental and perceptual phenomena to elementary processes; these theories saw the "whole" as no more than the sum of simple parts that were provided by the physical environment.

Numerous factors—insight, "cognitive maps," transposition, language, contextual aspects of memory, narrative reconstructions, Gestalt principles of perception, the transition from concrete to formal operations during human development, and the modes of reasoning brought to bear on moral issues—point together to the active, integrative, dynamic mental processes that shape and finally determine perceptual and cognitive outcomes.

Objectives: Upon completion of this lecture, you should be able to:

1. Compile the findings and theories developed in lectures seventeen through twenty-two to frame a general conception of "cognitive" psychology.
2. Outline the scope and origins of the "cognitive revolution."

Outline

I. The operations involved in cognition are quite different than those found in the domain of perception.

- **A.** The foundation of cognition is propositional in nature. We can formulate purely abstract cognitive propositions.
  - **1.** One can answer Piaget's conservation task without even looking at the containers. To have the concept of conservation is to have a formal, logical recognition of the property of identity.
  - **2.** In Piaget's scheme, where is conservation? It certainly isn't empirically conserved, but there is a cognitive, theoretical conservation. The theory assumes an ideal context.
- **B.** When the data is sufficiently reliable, it can be absorbed into a general, theoretical framework that is purely conceptual. It is an idealization, not a perception that would insist that there is always less in the second beaker.
- **C.** These conceptions take a propositional form. This is especially evident in classical physics.
  - **1.** In one work, St. Augustine seeks to demonstrate that we can have clear concepts that cannot be perceived. We can perceive and conceive of a four-sided figure, but no one can perceive a thousand-sided figure, although it can be conceived. This latter conception is in the form of a propositional argument.
  - **2.** Abstracts notions such as justice are wholly conceptual. There is no empirical standard of justice. Justice is discussed in the realm of the propositional.
- **D.** What follows is that a rich conceptual life is only available to those who can formulate propositions. The problem is that on the conceptual account, the concept doesn't describe anything, but it is simply a purely linguistic tool. There is no mapping of the conceptual upon the perceptible.
- **E.** A related feature is that cognitions are inevitably relational.
  - **1.** Karl Lashley's studies of transposition demonstrate that non-human animals are capable of learning a relationship, not simply a particular stimulus-reinforcement pairing. This is a capability required for any creature that will prosper in an ever-changing environment.
  - **2.** The cognitive side of psychology inevitably expresses these relational concepts.
- **F.** Cognition is an active process which seeks to make discoveries, not just make the world more clear.

II. Our cognitive capacities face limitations arising from tendencies such as functional fixedness. However, we are often able to cognitively transcend and break down the kind of functional fixedness with the understanding that

things are not necessarily as they seem. There is also the confirmation bias. When we formulate a hypothesis, we tend to find data that confirms the hypothesis, rather than weighing equally the evidence on both sides.

Essential Reading:

Henry Gleitman, Chap. 7

Supplementary Reading:

Darlene Howard, *Cognitive Psychology*. (1983) New York: Macmillan

Questions to Consider:

1. Conclude whether abstract concepts can be accounted for by a reductive materialism.
2. Outline what difficulties abstract concepts pose for the behaviorist.

Biographical Notes

B. C.

c.a.750 ....**Homer**: The blind poet who composed *Iliad* and *Odyssey,* in which the conditions influencing human thought, feeling, and action are developed.

469?-399.............**Socrates**: The father of that branch of philosophy that is concerned with the human condition, in contrast to the nature of the cosmos and the physical world. His teachings are developed systematically by his greatest student, Plato, in a collection of dialogues.

460?-377?...........**Hippocrates**: The father of Greek medicine whose students, the Hippocratics, practiced a holistic medicine that included dietary, aesthetic, and surgical forms of treatment.

427?-347.............**Plato**: The founder of the Academy in Athens, the first great school of philosophical studies, and the author of more than a score of dialogues that would set the agenda for much subsequent philosophical inquiry.

385-322...............**Aristotle**: The first systematic philosophical psychologist whose writings sought to integrate the biological, psychological, social, and political dimensions of life and to offer a developed theory of personality development as a function of these various influences. His school, the Lyceum, featured an extensive curriculum that included the natural sciences, politics, psychology, and ethics.

372?-287.............**Theophrastus**: Succeeded Aristotle as director of the Lyceum, where he organized the studies for more than three decades. His treatise on *The Moral Characters* is an early "type" theory of personality.

A.D.

130-200...............**Galen**: One of the earliest experimental biologists of the post-classical period. He practiced vivisection on a variety of animals, including pigs whose vocalizations he was able to eliminate by sectioning the recurrent lingual nerve, thus locating vocalization in the brain. His psychobiological theory of the "humours" was influential for centuries.

1515-88...............**Weyer**: Johann Weyer's treatise on witchcraft, *De Prestigiis Daemonum* (1579) was among the first to connect "witchery" to mental disturbances, chiefly melancholy.

1561-1626...........**Bacon**: Francis Bacon's *The Proficience and Advancement of Learning* (1605) signaled the rise of the modern scientific perspective. His *Novum Organum* (1620), the second part of his *Great Instauration*, would serve as something of a bible for the experimentally and scientifically inclined writers of the seventeenth and eighteenth centuries.

1564-1642...........**Galileo**: His astronomical observations and experiments in mechanics supported his writings in the philosophy of science, which proved to be authoritative in overthrowing much of the "old wisdom." His classic *Dialogues Concerning Two New Sciences* (1638) summarizes thirty years of research and the theories supported by it.

1596-1650...........**Descartes**: His research and writing did much to advance biological psychology, chiefly through the concept of reflex mechanisms and the general theory according to which many sensory and motor functions could be explained mechanically. He also defended a form of dualism that denied that the rational operations of the mind were causally brought about by material or biological processes. His *Treatise of Man* (1662) appeared posthumously and is the most "materialistic" of his psychological writings.

1642-1727...........**Newton**: Isaac Newton's *Principia* (1687) established the "rules" for scientific experimentation and theorizing that would be taken as authoritative thereafter.

1632-1704...........**Locke**: John Locke, a friend and great admirer of Newton's, set out in his *An Essay on Human Understanding* to develop something of a Newtonian theory of mind, and a Newtonian approach to the study of mental life in which basic sensations form simple and then more complex ideas by an associational process akin to gravitation.

1748-1832...........**Bentham**: Jeremy Bentham's *Principles of Morals and Legislation* (1789) tied all significant human and animal activity to considerations of pleasure and pain and all morality to considerations of utility.

1758-1828...........**Gall**: Franz Joseph Gall was the father of phrenology and one of the great neuroanatomists of the eighteenth century. His research and writings strongly supported the neurological perspective on psychology. His *Investigations on the Nervous System in General and on that of the Brain in Particular* (1809) was a multivolume contribution that was widely read and translated.

1795-1878...........**Weber**: E.H. Weber, the Leipzig physiologist, carefully studied the sense of touch and the ability of observers to discriminate weights of different magnitude. From these studies he was able to frame the first general law of sensory function, *Weber's Law*, which he published in 1835.

1801-87...............**Fechner**: Gustav Fechner's *Elemente der Psychophysik* (1860) established the experimental methods and overall perspective for research on sensation and perception. The work also includes his derivation of Fechner's Law.

1806-73...............**Mill**: John Stuart Mill did much to advance both empirical psychology and the experimental methods of inquiry. His *A System of Logic* (1843) defended the scientific and experimental approach to "human nature."

1808-82...............**Darwin**: Charles Darwin's *Origin of Species* (1859) and his *Descent of Man* (1871) put an essentially evolutionary psychology on the map of thought and gave impetus to the fields of comparative psychology and developmental psychology.

1817-68...............**Griesinger**: His *Mental Pathology and Therapeutics* (1845) begins with the claim that mental disease is grounded in disease processes in the brain.

1821-94...............**Helmholtz**: The premier scientist of the German-speaking world at mid-century, Helmholtz would advance significant theories on the physiology of auditory and visual functions. The original of his *Treatise on Physiological Optics* appeared in German in successive volumes between 1856 and 1866.

1824-80...............**Broca**: Pierre Broca identified and in 1861 reported the region of the brain which, when destroyed by a lesion, resulted in the patient's inability to speak; so-called Broca's aphasia.

1832-1920...........**Wundt**: The father of experimental psychology, Wilhelm Wundt founded the first university laboratory devoted to the subject in 1879 at the University of Leipzig.

1834-1918...........**Maudsley**: In his *The Physiology and Pathology of the Mind* (1867), Henry Maudsley provided robust clinical data and strong arguments in support of the medical model of mental illness.

1848-1905...........**Wernicke**: Carl Wernicke's clinical observations located the region of the brain which, when diseased, permitted the patient to speak coherently but not to comprehend the spoken word; Wernicke's syndrome.

1842-1910...........**James**: Perhaps the greatest of all psychologists, William James brought an irresistible literary style and great analytical and critical power to bear on the larger as well as the smaller issues in psychology. His *Principles of Psychology* (1890) is still the best systematic introduction to the subject.

1849-1936...........**Pavlov**: The discovery of the "conditioned reflex" and the general theory accounting for it are credited to Ivan Pavlov, who relentlessly advocated a purely biological approach to the issues traditionally regarded as "psychological." He advanced an outline of his position in his Nobel Prize address of 1905.

1850-1909...........**Ebbinghaus**: Hermann Ebbinghaus's *On Memory* (1885) was a pioneering work in the field of memory research.

1856-1939...........**Freud**: The father of psychoanalysis and the most influential psychologist of the twentieth century. With Breuer he published *Studies of Hysteria* in 1896, a prelude to the future theory of hysteria as the outcome of repression.

1857-1911...........**Binet**: Alfred Binet and Theodore Simon published *The Development of Intelligence in Children* in 1905 and helped launch the mental-testing movement.

1874-1939...........**Thorndike**: E.L. Thorndike's *Animal Intelligence* (1898) offered the first published records of the time-course of animal learning and presented the model of "instrumental conditioning" that would be the model of later behaviorist research.

1875-1961...........**Jung**: In his *Psychological Types* (1920) Carl Gustav Jung departs further from the traditional Freudian theory and develops the theory of the introverted and extroverted "types."

1878-1958...........**Watson**: The father of "American Behaviorism," John B. Watson opposed the mentalistic psychologies of his day and advocated as the proper subject of psychological investigation the actual observable behavior of human and nonhuman animals. His famous defense of this position appeared in his article in *Psychological Review* in 1913, "Psychology as the behaviorist views it."

1886-1961...........**Tolman**: E.C. Tolman's *Cognitive Maps in Rats and Man* (1948) summarized numerous and ingenious studies establishing the essentially cognitive nature of problem-solving.

1887-1967...........**Köhler**: One of the fathers of Gestalt psychology, Wolfgang Köhler published his seminal work on *Gestalt Problems and the Beginnings of Gestalt Theory* in 1925.

1890-1958...........**Lashley**: In *Brain Mechanisms in Intelligence* (1929), Karl Lashley offered an early installment of an illustrious career devoted to the study of central mechanisms in learning and problem-solving.

1896-1974...........**Piaget**: Jean Piaget's *The Child's Representation of the World* appeared in 1926 in French, but his influence was much later in the English-speaking world.

1904-88...............**Skinner**: B.F. Skinner's *Behavior of Organisms* appeared in 1938 and was followed by texts and articles establishing him as the major figure in the history of behaviorism.

Glossary

Absolute threshold: The minimum amount of stimulation sufficient to be experienced

Agnosia: The failure to comprehend the meaning or function of things otherwise correctly and accurately perceived.

Anthropomorphism: A form of explanation of non-human attributes in terms of allegedly comparable human attributes. Thus, the formation of ants approaching another colony is explained as an "army" ready to engage in "war."

Aphasia: Either expressive (as in Broca's aphasia) or receptive, the inability to use language.

Apraxia: The inability to perform stereotypical but complex movements such as putting on a jacket.

Anal stage: The second of Freud's stages of psychosexual development; the stage at which bowel functions are associated with sensual gratification.

AI: The acronym for "artificial intelligence."

Artificial intelligence: A form of "intelligent" or problem-solving performance achieved by a programmed computational device.

Basilar membrane: A membrane in the inner ear's cochlear duct along the length of which are the auditory receptor ("hair") cells.

Behaviorism: The theory or perspective according to which observable behavior is the exhaustive subject matter of a scientific psychology.

Biofeedback: The technique for making available to the observer information regarding his or her own physiological states and events; e.g., a visual display of one's own blood pressure or heart rate or skin resistance.

Bipolar: The form of manic-depressive illness in which episodes of both mania and depression occur, as distinct from *unipolar*.

Broca's Aphasia: An expressive aphasia resulting from a lesion in Broca's area, the third frontal convolution in the left hemisphere.

CAT scan: CAT is the acronym for computerized axial tomography; a radiographic technique for constructing three-dimensional anatomical pictures.

Catharsis: In psychoanalytic theory, the release (Gk. *catharsis*) of blocked psychic energy, typically by way of free-association and sustained talk.

Cognitive maps: Tolman's term for the apparent mental or cognitive representation of the external world, such that the rat is able to frame alternative courses of action to reach a desired goal.

Cones: In vision, the retinal receptor cells whose activation takes place in dim and brighter light, though not in darkness; cells that mediate the experience of color.

Conservation:

(a) In psychoanalytic theory, the principle according to which psychic energy in the system is "conserved," though it might express itself in a variety of ways; e.g., it might be expressed in the form of physical symptoms.

(b) In Piaget's theory of cognitive development, a principle that is understood only by older children; the principle according to which, e.g. the quantity of a thing is not changed when it is given a different shape.

Constancy (perceptual): The tendency to see known objects as retaining their known size and shape even as they are moved to more distant locations or are differently oriented; e.g., a saucer seen as round even when presented horizontally.

Conversion reaction: In psychoanalytic theory, the explanation of hysterical symptoms as the result of a conversion of psychic to physical processes.

Depth psychology: Psychological theories based on the concept of the unconscious, otherwise inaccessible at the superficial levels of perception and introspection.

Difference threshold: The minimum difference between two stimuli sufficient for the observer to distinguish

between them.

Duplex theory: The theory (fact) that vision is mediated by two functionally different types of receptors, rods and cones; the former activated at the lowest levels of illumination but unable to mediate the experience of color; the latter activated at higher levels of light intensity and associated with the perception of color.

Eudaimonia: In Aristotle's theory that form of "happiness" or "flourishing" that might be achieved by one whose overall form of life is rationally ordered and virtuous.

Ego: The "self" or "I" in psychoanalytic theory, fashioned out of the competing forces of the instinctual and the social.

Empiricism: That philosophical perspective according to which knowledge is grounded in experience, and experience is the ultimate standard of all knowledge claims. It may be contrasted with both rationalism and nativism.

Expert systems: A branch of engineering that seeks to identify the attributes of human expertise (e.g., medical diagnosis) and incorporate them into complex computational programs.

Extrovert: According to Carl Jung, the two dominant personality tendencies are toward extroversion or introversion, each of these forming a "type" of personality which, when known to the psychoanalyst, permits predictions in a wide range of circumstances.

Functionalism: A quite general perspective on biology and psychology according to which various processes or attributes are understood in terms of the functions served by them. Thus, the right question to ask about, e.g., "consciousness," is not what it is, but what it is *for*; what can be achieved by the organism possessing it which cannot otherwise be achieved.

Frontal lobe syndrome: A set of cognitive defects, often involving disrupted perceptions of events taking place over a stretch of time.

Genital stage: The final stage of psychosexual development in which sexual gratification is achieved through heterosexual intercourse.

Glove Anesthesia: A classic form of hysterical symptom in which sensitivity is diminished or lost over the region of the hand that would be covered by a glove, this not being possible as a result of actual nerve damage.

Heritability: The fraction of the total variance displayed by a characteristic that is attributable to genetic sources of variation.

Hermeneutics: Originally reserved to the field of biblical or scriptural interpretation, now used more generally to refer to explanation as a form of interpretation.

Heuristic: A device or scheme that aids in the diagnosis and solution of problems.

Hypnosis: The means or practice by which cooperative subjects can be placed in a state of semiconsciousness or unconsciousness but can still be "reached" in such a way as to alter their perceptions and actions.

Hysteria: Initially, an assortment of temperamental, perceptual, and behavioral abnormalities thought to be associated with childbirth and other gender-specific conditions; hence the word, which is a version of the ancient Greek for *uterus*; later referring indifferently to men and women displaying such perceptual, behavioral and emotional disturbances.

Id: In Freud's theory, the basic, instinctual core of drives inherited as part of the animal ancestry of the human race; tendencies toward self-gratification and self-preservation without the regulative influences of civilization.

Instinct: A typically complex pattern of behavior (i.e., unlike reflexes) exhibited (nearly) universally within a species or by one gender in that species, and appearing in essentially complete form without the benefit of practice or training.

Instrumental conditioning: The term used to designate conditioned behavior that is instrumental in problem-solving or in reaching a goal; as distinct from reflexes.

IQ: The "intelligence quotient" calculated by dividing mental age by chronological age and multiplying by 100. A 10-year old who scores at the mental level of the average 12-year old has an IQ of 120 (12/10 X 100).

Lateralization: The tendency of certain perceptual or behavioral capacities to be localized in one but not both halves of e.g., the cerebral cortex. Thus, lesion in the left hemisphere leads to paralysis on the right side of the body, etc.

Law of effect: Thorndike's law, stating that behavior is strengthened or weakened by the effects it produces; behavior leading to a "pleasing state of affairs" thus becoming more likely; that leading to pain or punishment, less likely.

Limbic system: In highly integrated collection of structures below the cerebral cortex and having strong associations with basic emotional patterns of behavior such as copulation, aggression, maternal activity, etc. The structures include the amygdala, the septum, the Isle of Rile, the hippocampus and the columns of the fornix.

Machine functionalism: A concept in contemporary philosophy of mind that would equate intelligence or cognition not with a specific anatomy (e.g., the brain) or type of animal (e.g., human) but with any generic device able to perform intelligent or cognitive functions.

***Malleus Maleficarum*:** "The hammer of evils" was *the* book in the fifteenth century that informed courts on the procedures for identifying witches and the punishments to be imposed on them. Written by two Dominicans (Sprenger and Kramer) it offered a perilous mixture of science, pseudo-science, and rank superstition.

Manic-depressive: A form of psychosis; a severe mental illness in which the sufferer experiences delusions and is overcome by episodes of uncontrollable and even suicidal depression and/or destructive forms of mania.

Materialism: That philosophical school or system that takes the ultimate reality to be a material reality, finally lacking in any other kind of "stuff"—notably "mental" stuff.

Mnemonic: A technique for aiding memory.

Nativism: A psychological orientation or theory according to which certain mental or cognitive powers are innate, requiring only time for maturation before expressing themselves in their full form.

Neo-Freudian: The member of a psychoanalytic school or system indebted to Freudian theory but departing from it to a greater or lesser extent.

Noise: A technical term referring to any event or entity that interferes with the detection of a target-stimulus.

Nomological-deductive model: Developed and defended by Carl Hempel, a model of scientific explanation based on the proposition that an event has been explained scientifically when it is shown to be deducible from a general law (Gk. *nomos* = law)

Nonsense syllables: Used by Hermann Ebbinghaus in his pioneering studies of associative memory processes. Typically, such syllables are formed by a consonant-vowel-consonant sequence such as MIB, TUJ, etc.

Ontology: The branch of metaphysics addressed to questions regarding real or actual being. Whether or not there are actually existing minds or consciousness or thoughts (as distinct from matter) is an *ontological* question.

Operant: Skinner's technical term for an observable musculo-skeletal movement.

Oral stage: The first stage in Freud's theory of psychosexual development; the stage at which sensual gratification is achieved by oral stimulation, such as sucking.

Ossicles: The three bones of the middle ear which translate motion from the ear drum to the cochlear duct of the inner ear.

Payoff matrix: In general, the costs and benefits of various decisions and decision-strategies; in signal detection theory, the costs assessed against either false alarms or missed targets.

Phallic stage: The stage of psychosexual development when sexual gratification is achieved through genital self-stimulation.

PET scan: The acronym stands for *positron emission tomography.* Radioactively tagged elements are introduced into the blood supply to the brain so that the rate of oxidation in various regions can be monitored in real time, thus providing a record of activity in specific regions.

Pitch: The auditory sensation associated with the frequency of sound.

Physiognomy: The pseudo-science of Lavater, which promised to reveal basic personality and moral characteristics by the close study of facial types.

Pleasure principle: Freud's term for the controlling influence that modes of sexual gratification have on behavior; a principle grounded in the ancestral and instinctual animal pleasures and tied to survival and procreation.

Positivism: A philosophical defense of scientific modes of inquiry as the only source of valid knowledge. The "positive" knowledge of science is contrasted with superstition, religious faith, and untestable intuition.

Psychosexual development: Freud's conception of the maturation of sexuality from the nourishment-based instincts of infancy to adult procreative sexuality; a maturation in which basic instinctual inclinations are "socialized" by the adult community.

Rationalism: A term used somewhat imprecisely to cover various philosophical positions and systems that may have little in common; but generally covering philosophical arguments to the effect that all valid knowledge must be in the form of rationally intelligible and integrated ideas rather than the disjointed facts of bare experience.

Reality principle: As used by Freud, a concept covering the socialization and civilizing of those impulses grounded in the Pleasure Principle.

Receptors: Specialized cells that respond selectively to particular classes of physical or chemical stimuli. The rods and cones of the retina and the hair cells of the inner ear are examples.

Repression: In psychoanalytic theory, the mechanism or process by which unacceptable thoughts and desires are kept out of consciousness and are driven (repressed) into the recesses of the unconscious.

ROC curve: The acronym stands for *receiver operating characteristics* and refers to the performance of a detection system. The curve is a plot of the rate of false alarms against the rate of "hits."

Rods: Receptor cells in the retina, sensitive to the lowest levels of visible illumination but not associated with the color-sensing mechanisms of the visual system.

Schizophrenia: A form of psychosis characterized by hallucinations, delusions, and thought so disordered as to prevent a rational form of life.

Span of apprehension: The maximum number of items that can be kept in immediate memory after a brief exposure. In the absence of special "priming" techniques, this number is on the order of 7 or 8.

Split brain: A term referring to the surgical disruption of pathways that join the two halves of the brain.

Structuralism: In the modern history of psychology, this term was used to describe that program of research and theory devoted to unearthing the structure of mental life; the sensations, images, feelings, and interactions among these giving rise to mental life.

Superego: In psychoanalytic theory, the equivalent of "conscience."

Teleological: An explanation of an event or thing based on the purpose or goal (Gk. = *telos*) achieved as a result of that event or thing. The long neck of the giraffe is teleologically explained when the attribute is connected to the nutritional requirements of the species and the altitude of needed vegetation.

Unconscious: As distinct from non-conscious or the medical sense of "unconscious", the psychoanalytic concept of a dynamic realm of motives and conflicts, outside the reach of consciousness, but shaping conscious behavior.

Unipolar: The form of manic-depressive illness in which mood swings are generally absent and the patient is either in one or the other phase of the disorder. Depression is the more common form of unipolar manic-depressive disease.

Timeline

B.C.

ca.750..................Homer's *Iliad* and *Odyssey*

399..................Socrates chooses death over dishonor

400..................Hippocrates flourishes

367..................Plato founds the Academy

335..................Aristotle founds the Lyceum

322..................Theophrastus succeeds Aristotle as director of the Lyceum

A.D.

180................Galen undertakes research on the nerves in relation to behavior

1579 ....Johann Weyer's *De Prestigiis Daemonum* published

1605................Francis Bacon's *The Proficience and Advancement of Learning*

1609................Galileo observes the moons of Jupiter

1644................Descartes's *Principles of Philosophy*

1687................Isaac Newton's *Principia*

1690................John Locke's *An Essay on Human Understanding*

1789................Jeremy Bentham's *Principles of Morals and Legislation*

1809 ....Franz Joseph Gall's *Investigations on the Nervous System in General and on that of the Brain in Particular*

1835................Weber's Law

1843................John Stuart Mill's *A System of Logic*

1845................Griesinger's *Mental Pathology and Therapeutics*

1856................The first volume of Helmholtz's *Treatise on Physiological Optics*

1859................Darwin's *Origin of Species*

1860................Fechner's Law

1861................Pierre Broca identifies "Broca's area"

1867................Henry Maudsley's *The Physiology and Pathology of the Mind*

1879................Wundt establishes the psychology laboratory at Leipzig

1885................Ebbinghaus's *On Memory*

1890................William James's *Principles of Psychology*

1896................Freud and Breuer publish their *Studies of Hysteria*

1898................E.L. Thorndike's *Animal Intelligence*

1900................Freud's *The Interpretation of Dreams*

1905................Ivan Pavlov gives Nobel Prize address

1905................Alfred Binet and Theodore Simon publish *The Development of Intelligence in Children*

1913................John Watson's "Psychology as the behaviorist views it"

1920 ....Carl Jung's *Psychological Types*

1925................Wolfgang Köhler's *Gestalt Problems and the Beginnings of Gestalt Theory*

1926.................Jean Piaget's *The Child's Representation of the World*

1929 ....Karl Lashley's *Brain Mechanisms in Intelligence*

1932................E. C. Tolman's *Purposive Behavior in Animals and Men*

1938................B. F. Skinner's *Behavior of Organisms*

1948................E. C. Tolman's *Cognitive Maps in Rats and Man*

1954................James Olds publishes *Studies of Reward and Punishment Centers in the Brain*

1956................Solomon Asch's "Studies of independence and conformity"

1959................Noam Chomsky reviews Skinner's *Verbal Behavior*

1963................Lawrence Kohlberg's "Development of children's orientations toward a moral order"

1963................Stanley Milgram, "Behavioral study of obedience"

1972................Jean Piaget's *The Child's Conception of the World*

1973................David Rosenhan's "On being sane in insane places"

Comprehensive Bibliography

Essential Readings

Henry Gleitman, *Basic Psychology* (1992, 3d ed.) New York: Norton.

Daniel N. Robinson, *An Intellectual History of Psychology* (1995, 3d ed.) Madison: University of Wisconsin Press.

Supplementary Readings

Bacon, Francis *Novum Organum*. (1620/1994) P. Urbach and J. Gibson, trans. & eds. Chicago: Open Court. (The classic early defense of the experimental-observational approach to science.)

Barnes, J. *Early Greek Philosophy*. (1987) London: Penguin. (The pre-Socratics and the overall intellectual context from which Plato's works would depart and also on which they would depend to some extent.)

Borst, C.V. ed. *The Mind/Brain Identity Theory*. (1970) New York: St. Martin's. (Seminal essays on the mind/body problem by leading thinkers.)

Bouchard T. and McGue, M. "Familial studies of intelligence: A review." *Science*, 1990, 212, pp. 1055-59. (A review of the twin studies and estimates of the heritability of intelligence based on them.)

Bremer, Jan *The Early Greek Concept of the Soul*. (1983) Princeton: Princeton University Press. (The soul-theories to be found chiefly in Homer's epic poems and the writings of Hesiod.)

Chomsky, N. *Reflections on Language* (1975) New York: Pantheon (Chomsky's nativist theory of language and brain-based theory of a universal generative grammar developed and defended.)

Coren, S. and Girgus, J. *Seeing Is Deceiving: The Psychology of Visual Illusions*. (1978) Hillsdale, New Jersey: Lawrence Earlbaum (A good "book of illusions," supplemented with explanations and implications for a general theory of perception.)

Darley, J. and Latané, B. "Bystander intervention in emergencies: Diffusion of responsibility". 1968, *Journal of Personality and Social Psychology*, vol. 10, pp. 210-14. (Research on the contextual conditions favoring or discouraging helping-behavior).

Darwin, C. *Origin of Species* (1859) London: John Murray (THE BOOK)

Descartes, René *Discourse on Method* (1637) in vol. I, *The Philosophical Writings of Descartes*. J. Cottingham, et al., trans. (1985) Cambridge: Cambridge University Press. (His "method of doubt," theory of "clear ideas," and cogent criticisms of more traditional modes of inquiry.)

Dray, W. *Laws and Explanation in History*. (1957) New York: Oxford University Press. (A systematic and powerful defense of the claim that historical and social events are not reducible to the sorts of events amenable to scientific explanation; a critique of the nomological-deductive mode of explanation.)

Dreyfus, H. *What Computers Can't Do*. (1979) New York: Harper and Row (Dreyfus argues that "intelligence" figures in all we do, cannot be reduced or modularized, nor can it be extracted from the contexts in which it invariably functions.)

Dunker, K. "On problem solving." 1945, *Psychological Monographs*, No. 270, 113 pp. (Dunker's classic treatise on the logic of problem-solving and its ineradicably cognitive nature.)

Ebbinghaus, H. *Memory: A Contribution to Experimental Psychology* (1885). (1964) New York: Dover (reprint) (The classic work on associative learning and memory; the foundational work.)

Eccles, J.C. and Robinson, D.N. *The Wonder of Being Human: Our Mind and Our Brain*. (1984) New York: Free Press. (A critique of materialistic theories of mind and of attempts to reduce the mental to the physiological.)

Erikson, E.H. *Dimensions of a New Identity*. (1974) New York: Norton (The non-Freudian perspective on life's stages and the grounding of its meaning.)

Fechner, G.T. *Elements of Psychophysics* (1860). Helmust Adler, trans. (1966) New York: Holt, Reinhart & Winston (The founding treatise in psychophysics by the scientist who invented the field.)

Flynn, F. ed. *Advances in Behavioral Biology: The neurophysiology of aggression*. (1975) New York: Academic Press (Brain mechanisms subserving emotional behavior, especially the limbic system in relation to aggression.)

Foucault, M. *Madness and Civilization*. (1965) New York: Random House. (The seminal work on the cultural construction of mental illnesses.)

Freud, S. *A General Introduction to Psychoanalysis*. (1952) New York: Washington Square Press. (A synopsis by the father of it all.)

Galileo *Dialogues Concerning Two New Sciences* (1638/1954). Henry Crew and A. de Salvio, trans. New York: Dover. (Incisive, revolutionary, critical, and dazzling as an introduction to experimental physics, the ignorance of the past, the promise held out by the new perspective on science.)

Gilligan, C. *In a Different Voice*. (1982) Cambridge: Harvard University Press (Against Kohlberg's theory, this work argues for an appreciation of the several "voices" in which moral sensibilities find expression; the emphasis on empathy and sympathy over the "logic" of morals.)

Ginzburg, C. *Ecstasies: Deciphering the Witches' Sabbath*. (1991) New York: Pantheon. (The cultures of superstition and punishment regnant in the Renaissance.)

Gleitman, H. *Basic Psychology* (3d ed.) New York: Norton, 1992. (The essential text for the course).

Goldstein, E. *Sensation and Perception* (3d ed.) (1989): Belmont, CA: Wadsworth. (An excellent and comprehensive text on the subject.)

Green, B. & Swets, J. *Signal Detection Theory & Psychophysics*. (1966) New York: Wiley. (The theory of signal detection and its contributions to the understanding of perception and decision-making.)

Hempel, C. *Aspects of Scientific Explanation*. (1965) New York: Free Press. (Essays in defense of the nomological-deductive model of science and replies to critics.)

Howard, D. *Cognitive Psychology*. (1983) New York: Macmillan (Thorough basic text covering all major areas of the subject.)

Hume, D. *A Treatise of Human Nature* (1739) L.A. Selby-Bigge, ed. (1965) New York: Dover. (One of the most influential treatises in defense of the empirical theory of knowledge.)

Kenny, A. *Aristotle on the Perfect Life*. (1990) Oxford: Oxford University Press. (Aristotle's perfectionist scheme of life and its dependence on the larger context of the polis.)

Kohlberg, L. ed. *The Psychology of Moral Development*. (1984) San Francisco: Harper and Row. (Kohlberg's theory and replies to critics; summaries of major findings, defenses and explanations of the methods.)

Köhler, W. *The Mentality of Apes*. (1927) New York: Harcourt Brace (A classic in the tradition of Gestalt psychology, summarizing studies of insight and problem-solving by the great apes.)

Köhler, W. *Gestalt Psychology* (1947) New York: Liveright. (Basic principles of Gestalt psychology set forth by the master of the school.)

Kolb. B. and Whishaw, I. *Fundamentals of Human Neuro-psychology*. (1990) New York: Freeman (A good introduction to the methods of neuropsychological assessment, to basic research relating brain-function, to cognition and memory.)

Lamiell, J. *The Psychology of Personality*. (1987) New York: Columbia University Press (A sustained critique of the nomothetic approach to assessment and a defense of person-oriented theories.)

La Mettrie, J. O. de *Man: A Machine* (1748/1912), M. Calkins, trans. Chicago: Open Court. (The Enlightenment's naughty book, defending an utterly materialistic theory of mind and mental life.)

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Lockheart, R. and Craik, F. "Levels of processing: A retrospective commentary on a framework for memory research." 1990, *Canadian Journal of Psychology*, vol. 44, 87-122. (Beyond the memory "trace," this monograph summarizes the most important work on memory "priming" and related cognitive aspects of memory.)

Loftus, E. *Eyewitness Testimony* (1989) Cambridge: Harvard University Press (The leading researcher summarizes the factors that lead to misidentification and false alarms.)

Mather, C. *On Witchcraft.* (1662/1991) New York: Dorset (Cotton Mather's confident theory and relentless assaults on those who would be different.)

Milgram, S. *Obedience to Authority.* (1974) New York: Harper & Row (The famous studies of obedience are discussed by the man who made them famous.)

Mischel, W. *Introduction to Personality*, 4th ed. (1986) New York: Holt, Rhinehart and Winston. (A standard text in the field, rich in detail and explanation.)

Moody, T. *Philosophy and Artificial Intelligence* (1995) New Jersey: Prentice Hall. (The main claims of the AI community are summarized, as is the criticism advanced against these; up-to-date and clear.)

Neisser, U. *Memory Observed.* (1982) San Francisco: Freeman (Memory in the real world, beyond the laboratory and its controls.)

Newton, I. *Philosophiae Naturalis Pricipia: I. The method of natural philosophy.* In *Newton's Philosophy of Nature.* (1953) H. S. Thayer, ed. New York: Haffner. (One of the greatest achievements of the scientific mind.)

Pavlov, I.P. *Conditioned Reflexes*, G.V. Anrep, trans. (1927) New York: Oxford University Press. (Presents Pavlov's research and theoretical writings and reveals the unwavering physical perspective of the father of classical conditioning.)

Penfield, W. *The Mystery of the Mind* (1975) Princeton: Princeton University Press (The greatest neurosurgeon of the 20th century discusses the implications of a lifetime of probing the recesses of the human brain in patients able to reflect "on-line"!)

Piaget, J. *The Language and Thought of the Child.* (1955) New York: Meridian Books (A good introduction to Piaget's approach and perspective, with useful discussions of the famous stages.)

Plato, *The Dialogues,* Benjamin Jowett, Trans. New York: Random House, 1953 (All philosophy, said Whitehead, is "a footnote to Plato.")

Posner, M. and Petersen, S. "The attentional system of the human brain." 1990, *Annual Review of Neuroscience*, vol. 13, pp. 25-42. (Attention is explicated here in terms of basic neurophysiological processes; reviews of major research are offered as well as suggestive theories of attentional processes.)

Restak, R. *The Brain.* (1988) New York: Bantham (A good general introduction to "the brain sciences," based on the PBS series on *The Brain.*)

Robinson, D. *Aristotle's Psychology.* (1989) New York: Columbia University Press. (A review and interpretation of the systematic psychology developed by Aristotle across a range of his treatises.)

Robinson, D. *Philosophy of Psychology.* (1985) New York: Columbia University Press. (An examination of modern perspectives and approaches to definition and explanation in psychology.)

Robinson, D. *Wild Beasts and Idle Humours: The Insanity Defense from Antiquity to the Present.* (1996) Cambridge: Harvard University Press. (How the law has understood mental life from the time of Homer.)

Robinson, D. ed. *Social Discourse and Moral Judgment.* (1989) San Diego, California: Academic Press (Essays by leading psychologists and moralists on the nature of morality and the conditions under which it is exercised and understood.)

Robinson, D. *An Intellectual History of Psychology* (3d ed.) Madison: University of Wisconsin Press, 1995. (A survey of psychological thought drawn from Western intellectual history.)

Rosenhan, D. "On being sane in insane places." 1973 *Science*, vol. 179, pp. 250-58. (Once committed, Rosenhan and his colleagues were treated as mental patients, no matter how they behaved!)

Rosenthal, A.M. *Thirty-eight Witnesses*. (1964) New York: McGraw Hill. (Kitty Genovese was left without help by thirty-eight eyewitnesses as her assailant proceeded to kill her.)

Rock, I. *An Introduction to Perception* (1975) New York: Macmillan (A good treatment of the subject; not so technical as to require prior study.)

Sherif, M. et al., *Intergroup Conflict and Cooperation*. (1961) Norman: University of Oklahoma Press. (The Robbers' Cave experiments and their implications.)

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Skinner, B.F. "Can psychology be a science of the mind?" 1990, *American Psychologist*, vol. 45, pp. 1206-10. (The "mind," as redone by the leader of behavioristic psychology.)

Skinner, B.F. *Beyond Freedom and Dignity*. (1971) New York: Knopf (The world as it should be, according to B.F. Skinner; NO PRAISE—NO BLAME!)

Segall, M. et al. *The Influence of Culture on Visual Perception*. (1966) New York: Bobbs Merrill (The "carpentered world" of the West yields perceptual tendencies different from those found in less structured places.)

Shepherd, R. *Mind Sights*. (1990) New York: Freeman (Mental rotation and other rich cognitive events are discussed with insight and suggestively.)

Sternberg, R. *Beyond I.Q.* (1985) London: Cambridge University Press. (Sternberg's "triarchic" theory of intelligence and his stern criticism of the conventional view of intelligence.)

Tolman, E.C. "Cognitive maps in rats and man." 1948, *Psychological Review*, vol. 55, pp. 189-208. (Rats know more than they reveal—until the research gives them a chance to show it!)

Tulving, E. and W. Donaldson, eds. *Organization of Memory*. (1972) New York: Academic Press (An excellent introduction to the manner in which memory is studied and understood in the post-associationistic period.)

Watson, J.B. *Psychology from the Standpoint of a Behaviorist*. (1919) Philadelphia: Lippincot (THE statement!)

Wolpe, J. *The Practice of Behavior Therapy*. (1973) New York: Pargamon (The behavioristic approach to defining and treating "neurotic" disorders; Freudians need not apply.)

The Great Ideas of Psychology

Part III

Professor Daniel N. Robinson



THE TEACHING COMPANY ®

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Georgetown University

Daniel Robinson is professor of psychology at Georgetown University, where he has taught since 1971. Although his doctorate was earned in neuropsychology (1965, City University of New York), his scholarly books and articles have established him as an authority in the history of psychology, philosophy of psychology, and psychology and law. He holds the position of adjunct professor of philosophy at Georgetown and, since 1991, he has lectured regularly for the sub-faculty of philosophy at the University of Oxford.

Dr. Robinson's books include *The Enlightened Machine: An Analytical Introduction to Neuropsychology* (Columbia, 1980), *Psychology and Law* (Oxford, 1980), *Philosophy of Psychology* (Columbia, 1985), *Aristotle's Psychology* (1989), *An Intellectual History of Psychology* (3rd ed., Wisconsin, 1995) and *Wild Beasts & Idle Humours: The Insanity Defense from Antiquity to the Present* (Harvard, 1996). Dr. Robinson has served as principal consultant to the Public Broadcasting System for the award-winning series "The Brain" and the subsequent nine-part series, "The Mind." He is past president of two divisions of the American Psychological Association: the division of the history of psychology and the division of theoretical and philosophical psychology. He is fellow of the American Psychological Association and of the British Psychological Society. Dr. Robinson is also visiting senior member of Linacre College, Oxford.

The Great Ideas of Psychology
Table of Contents

The Great Ideas of Psychology

Scope

These forty-eight lectures examine the conceptual and historical foundations, the methods, the major findings, and the dominant perspectives in psychology. The subject is vast. The lectures are designed to achieve balance between basic processes and real-life issues; between the "hard science" and "soft science" of psychology; between the personal and the social; between the normal and the deviant.

In addition to a critical review of major findings and theories, the lectures examine several controversial issues arising from or illuminated by psychological research and theory. Included among these are the issue of "nature" versus "nurture"; theories of genetic or behavioristic or biological determinism; theories of moral relativism and absolutism; sex "roles" and gender stereotyping; the place of psychology within the legal system (e.g., in predicting violence, establishing competence, or determining whether or not a defendant is sane).

Although psychology and kindred disciplines help to clarify such issues, the lectures will point to the limitations imposed on any purely scientific or empirical approach to matters of this sort.

Objectives

The student will be able to:

1. Identify the broad historical and conceptual foundations of psychology from its origins in classical philosophy to the present;
2. Identify the major research methods and findings that characterize contemporary psychology;
3. Explain the principal claims and the main points of contention between and among the major schools and systems of psychology, including the behavioristic, the psychoanalytic, the neurocognitive, and social constructionist;
4. Explain the dependence of these issues on the larger framework bequeathed by the history of ideas.

Section Four: Psychology in the Materialist Tradition

Lecture Twenty-Five
Psychobiology—Nineteenth-Century Foundations

Scope: One of the enduring philosophical conundrums is the so-called "Mind/Body Problem" which, briefly put, has to do with the manner in which a purely physical or biological system—the nervous system—can create, cause, or be influenced by purely mental events or processes. For instance, how can a thought move a muscle, or a glandular secretion make someone happy? Traditional "solutions" to the problem include theories according to which the brain "secretes" thought, theories that deny the reality of anything purely "mental," theories by which minds and bodies cause changes in each other, and theories that question the very possibility of physical reality absent some mental realm in which it might "inhere"!

By the middle of the eighteenth century, science in general and clinical neurology in particular had advanced far enough to convince many that the complexities of human psychology were fully explicable by a scientific study of the nervous system. Pioneering and influential efforts along these lines were made by Franz Gall, whose system of phrenology—despite its errors and oddity—is still something of the model on which the modern "brain sciences" continue to be developed.

Objectives: Upon completion of this course, you should be able to:

1. Describe the Mind/Body problem and what it is that makes it a problem;
2. Contrast the strengths and weaknesses of various philosophical "solutions" to the problem;
3. Explain how the research and theory of Gall at the end of the eighteenth century set the stage for much of the progress in psychobiology over the next two centuries.

Outline

I. Materialist psychology is committed to the proposition that psychological phenomena are ultimately reducible to the material physiological realm. The mind/body problem refers to the inability to explain the interaction of two fundamentally distinct ontological domains.

- **A.** Descartes launched the modern discourse on the mind/body problem. He is commonly cited as a textbook dualist; he held that there were two separate realms of existence, the mental (*res cogitans*) and the physical (*res extensa*). He was primarily a one-way interactionist. On his account, the soul can affect the body, but not vice versa.
- **B.** Descartes had several critics. Gassendi, for example, argued that for the mind to influence the body, the body should be able to influence the mind in the same way.

II. As physiological studies developed, materialist psychologists believed that their findings corroborated a materialist solution to the mind/body problem.

- **A.** Franz Gall performed intricate studies on the nervous-system development of infants, as well as in-depth research on the neurological resources of criminals, geniuses.
  1. Phrenology developed out of what Gall saw as four incontestable truths. First, mental and moral faculties were taken to be innate. Second, for each discernible faculty there was an associated region of the brain. Third, the amount of this faculty which one possesses depends upon the relative amount of the brain devoted to it. Fourth, the areas of the brain that grow more quickly push out on the young, relatively soft skull, thus creating bumps on the skull which correlate to the degree to which particular faculties are possessed.
  2. These suppositions led Gall to the conclusion that by palpating the skull of individuals, he could arrive at a relatively good sketch of that person's psychological attributes.
- **B.** Taking as his point of departure the central thesis of phrenology, Pierre Flourens began experimental neurosurgery in the form of ablation. By ablating a particular region of the brain, he thought that the associated faculties would be removed. This is regarded as a "modular" theory of brain function.

C. During the first half of the century, the most notable figure in this area of psychology was Karl Lashley. After teaching animals some transposition exercise, he performed various surgical procedures to find the "engram" where learned items are stored. He found that it was not possible to remove a specific region of the brain that functioned as his supposed "engram." He ended up concluding with the following generalizations:

1. Specific deficits that are created as a result of surgery can be overcome by retraining. He referred to this plasticity of the brain as the principle of equipotentiality;
2. The degree of deficit depended much less upon which part of the brain was removed than upon how much of the brain was removed. This he referred to as the principle of mass action.

Essential Reading:

Daniel N. Robinson, Chaps. 9, 10

Supplementary Reading:

Wilder Penfield, *The Mystery of the Mind* (1975) Princeton: Princeton University Press

Richard Restak, *The Brain*. (1988) New York: Bantham

Questions to Consider:

1. Explain, if Descartes is right, by what means it could be posited that the mental and physical interact.
2. Explain how dualism could be empirically distinguished from materialism?

Lecture Twenty-Six
Language and the Brain

Scope: In 1861 Paul Broca examined the brain of a deceased former patient who had been unable to speak at all, except for repeated utterances of the meaningless sound, "tan." Broca discovered a damaged region of the cerebral cortex on the left side of the brain. The damage (lesion) was in the frontal lobe in a region since known as "Broca's area." The inability to speak in coherent fashion is Broca's aphasia. It is an expressive disability in that the patient can understand spoken language but cannot produce it. Lateral and posterior to Broca's area is Wernicke's area, serious damage to which results in a receptive aphasia such that patients can speak normally but cannot comprehend what is said to them.

That linguistic functions are highly lateralized (i.e., organized chiefly but not exclusively in the left hemisphere) is further suggested by studies of split-brain patients whose hemispheric connections have been surgically severed. When stimuli are delivered in such a way as to reach only the right hemisphere of such patients, they cannot name what they have seen, although they can point to an object that matches it.

Noam Chomsky advances a theory of language based on the notion that linguistic functions are innately "programmed" by the very organization of language-generating systems within the brain. Vocabulary, accents, and styles of speech are, of course, learned, but the formal structure of language—which Chomsky takes to be universal—reflects the structural organization of the language-generating systems of the brain.

Objectives: Upon completion of this lecture, you should be able to:

1. Outline the nature of and differences between Broca's aphasia and Wernicke's syndrome.
2. Explain why patients undergo the "split brain" operation.
3. Describe some of the odd effects resulting from severing the connections between the two hemispheres.
4. Explain Chomsky's concept of "universal grammar" and his essentially neurological theory of language.

Outline

I. Descartes suggested that three characteristics distinguish humans from any purely mechanical device:

- **A.** No machine will ever have a conception of God.
- **B.** No machine will ever hold abstract concepts.
- **C.** No machine will ever engage *creatively* in language.

II. Descartes contributed to a tradition that originated with Stoics and which held that language distinguishes humans and is an essential part of human rationality. Language is thus of strong interest to the materialist psychologist.

- **A.** From the point of view of physiological psychology, Broca made the first attempt to shed light on this issue through the study of his famous patient who could not express himself in language. He had an expressive aphasia.
  1. Broca discovered in a postmortem examination that his patient had a lesion in the frontal lobe of the left hemisphere.
  2. The lesion was found in an association cortex.
- **B.** There are several other symbol-manipulating deficits which result from particular lesions in the cerebral cortex.
  1. The inability to write is called agraphia.
  2. Acalculia is the inability to perform routine, trivial calculations.
  3. The inability to detect the melodic qualities of sound is amelodia.
- **C.** Posterior to Broca's area is Wernicke's area. Receptive aphasia is the result of a lesion to Wernicke's area. This does not mean that the expressive performance is wholly intact, only that there is a certain expressive coherence.

D. When the two hemispheres of the brain are split apart, by severing the corpus callosum, an interesting phenomenon occurs.

  1. Often the hemispheres are severed in order to prevent the spread of an electrical discharge and the establishment of a "mirror focus" in sufferers of epilepsy.

  2. Sperry did systematic studies of animals that had their corpora callosa severed. He found that these animals appeared normal outwardly, but they suffered abnormal perception.

  3. Basic neurological tests reveal that human patients are normal. If, however, a patient is given a split screen with an image projected to one side, the patient will not be able to name the object. If projected to the other side, the patient will be able to successfully identify the image. This is quite distinct from visual agnosia or apraxia. The naming function requires linguistic abilities which are primarily located in one hemisphere.

E. Do these findings prove that language is isolated in the dominant side of the brain? The best evidence now is that while the function is highly lateralized, there are clearly linguistic functions on both sides.

Essential Reading:

Henry Gleitman, pp. 35-37, 226-30; 251

Supplementary Reading:

B. Kolb and I. Whishaw, *Fundamentals of Human Neuro-psychology*. (1990) New York: Freeman

Questions to Consider:

1. Explain, if language is truly creative, whether it can be fully explained by reference to physiology.
2. Conclude to what extent non-human animals can be said to possess language.

Lecture Twenty-Seven
Rationality, Problem-Solving and Brain Function

Scope: Clinical neurology provides extensive support for the central claim of the philosophical materialist; viz., that the psychological, rational, and cognitive dimensions of human life are causally brought about by the functions of the brain. As Lorber and others have shown via PET scans, however, the specific regions of the brain associated with such functions take shape only during the course of early development. If they are damaged quite early in development, the same functions seem to be taken over by surviving areas.

Certain neurological disturbances arise from lesions in specific regions of the brain. Some are of a quite general and interpretive nature, as contrasted with specific sensory or motor dysfunction (e.g., blindness, paralysis). There are, for example, visual agnosias such that a person with otherwise normal perceptual abilities cannot interpret what is seen; there are apraxias such that an otherwise "normal" person cannot put on a jacket or seal an envelope. Finally, there are frontal lobe syndromes in which a seemingly normal person cannot solve any problem that calls for the integration of bits and pieces of information over a period of time. The patient is said to have lost some sort of time-binding capacity. Such patients might persevere in uttering sentences or expressing thoughts, even when instructed to change topics; they might not be able to make plausible inferences as to the short-term consequences of actions now being taken.

Objectives: Upon completion of this lecture, you should be able to:

1. Describe how some quite general deficits arise when specific regions of the brain are diseased or destroyed. But the specificity of the region develops only over the course of early development.
2. Explain how general features of problem-solving and rational analysis are degraded when cortical areas are diseased.
3. Demonstrate that these effects are of a cognitive nature but do not result in anything akin to insanity or what is usually meant by mental illness.
4. Identify the modern research methods of positron emission tomography (PET scans) and magnetic resonance imaging (MRI) by which the intact and active brain can be visualized during problem-solving tasks, thinking and perceiving.

Outline

I. There is a high degree of localization of function in the brain. This still leaves open the question of how thought is to be understood in relation to the brain. While maintaining this high degree of localization at early stages of development, the brain is quite flexible.

- **A.** About ten to fifteen years ago, John Lorber began his studies on the first survivors of hydrocephaly.
  - **1.** Prior to Lorber's study, a shunting procedure was developed to prevent pressure on the cortex by draining off spinal fluid.
  - **2.** One can utilize positron emission tomography (PET scan) to measure brain activity over time.
  - **3.** Lorber found that in children who had undergone the above procedure, other regions of the cerebral cortex took over the functioning of those areas damaged by the hydrocephaly.
- **B.** It remains unclear how the physiology of the system increases the precision of functioning while reducing the ability to compensate.

II. Laboratory experiments regularly find that profound changes in physiological resources have obvious results in psychological functioning. In the area of problem-solving, frontal lobe lesions are correlated with particular cognitive deficits.

- **A.** One characteristic of a frontal lobe lesion is a problem with time-binding. The patient is unable to knit events together over time.
- **B.** Similarly, some people with frontal lobe lesions experience perseverations. They frequently repeat phrases or ideas that they have already expressed. The system has insufficient resources to move on to a proximate task when a particular problem has been solved.

C. The abilities of Alzheimer's patients are often underestimated by standard, surface tests of cognitive capabilities.
   1. On average, Alzheimer's patients show a 40 percent shrinkage in the hippocampus, which has an indispensable role in memory.
   2. Perhaps this extremely large loss of memory manifests itself in the cognitive domain.
   3. Nootropic drugs have been developed to improve the problem-solving abilities of the recipients. There have been some successes with both non-human animals and in the geriatric population.

D. Particular forms of autisms are characterized by extraordinarily compulsive behaviors resulting from difficulties in frontal lobe functioning. These compulsions are unexplainable on rational grounds and are taken to be self-justifying.

Essential Reading:

Henry Gleitman, pp. 29-41

Supplementary Reading:

Kolb and Whishaw, op. cit.

Questions to Consider:

1. Explain by what means the brain is able to "rewire" itself to compensate for particular traumas at an early age.
2. Identify in what ways the critical period hypothesis (Chomsky) contributes to this discussion?

Lecture Twenty-Eight
The "Emotional" Brain—The Limbic System

Scope: Jeremy Bentham proclaimed that nature had placed humanity under "twin masters": pleasure and pain. Psychology in the tradition of philosophical materialism has been advanced by clinical and laboratory research identifying specific regions of the brain that are associated with emotionality, pleasure, pain, and various motivational states akin to hunger, thirst, and sexuality. This lecture reviews the methods and the general findings, paying particular attention to studies of the limbic system in relation to such basic states as pleasure, pain, motivation, rage, and fear.

Objectives: Upon completion of this lecture, you should be able to:

1. Identify the gross anatomy of those subcortical regions comprising the limbic system.
2. Summarize the methods of electrical stimulation and recording.
3. Identify so-called "reward" and "punishment" centers in the brain.
4. Explain the extent to which clinical findings from human patients match up with the experimental findings based on studies of non-human animals.

Outline

I. Within a Darwinian context, emotions should be expected at multiple levels within the evolutionary scheme. Any animal without the capacity for fear or discomfort is imperiled. Learned avoidance of destructive stimuli presupposes some degree of emotionality.

- **A.** The regions of the brain that developed in non-human animals are the same ones that mediate emotions in the human species. These are the sub-cortical structures of the limbic system. This matches up with an evolutionary framework.
- **B.** There is incessant communication between sub-cortical mechanisms and the cortex. The right model is one of mutual feedback, not a hierarchical model.

II. At the University of Chicago in the 1930s, studies were done on bitemporal ablation in Rhesus monkeys. The animals, normally cantankerous, became quite docile after the operation. There was also an increase in sexuality and the appearance of hypermetamorphosis. This is known as the Kluver-Bucy syndrome.

- **A.** Prior research had suggested that the temporal cortex was irrelevant to the emotional functions that were disturbed in the monkeys. Structures of the limbic system under the surface of the temporal cortex, however, are central to emotionality.
- **B.** This does not necessarily imply that the environment plays no role in shaping emotions.
  1. The research of Kuo on predatory behavior found that such behavior depends less on instinct and more on parental behavior.
  2. Often what we take to be instinctual characteristics are really dispositions that can be shaped by the environment.

III. If the materialist project is correct, there should be pleasure and pain centers in the brain.

- **A.** Olds and Milner discovered, in an operant conditioning experiment, that organisms will often choose to press a bar to stimulate a particular region in the brain. The organism will stimulate the region almost incessantly.
- **B.** How we want to treat these centers as causally related within a conditioning scheme is an open question. In experiments where an animal is given a choice between types of direct brain stimulation, the animal will not invariably choose to stimulate that region for which it had the strongest conditioning history. The result is quite different when food or drink is provided as a reinforcer.
- **C.** Some human patients, with consent, have been given such direct brain stimulation. These limbic system studies show some degree of comparability with the studies of non-human animals.

Essential Reading:

Henry Gleitman, pp. 28-29; Chaps. 2, 9

Supplementary Reading:

J. Flynn, ed. *Advances in Behavioral Biology: The Neuro-physiology of Aggression*. (1975) New York: Academic Press

Questions to Consider:

1. Explain, if emotions have a physiological grounding, whether the dualist is doomed.
2. Conclude to what extent it can be successfully argued that emotions are socially constructed.

Lecture Twenty-Nine
Violence and the Brain

Scope: In light of the findings and theories developed in previous lectures, the question arises as to the extent to which people found guilty of violent and criminal behavior should be held fully responsible. It has long been argued that criminality is a form of pathology better understood in scientific than in moral terms.

This lecture considers a number of "insanity defenses" that have been based on claims of dysfunctional brain processes. These include such conditions as (a) neurological reactions to toxic chemicals, (b) pre-menstrual syndrome, (c) temporal lobe tumors, (d) "automatism" and sleep-walking, and (e) drug-induced states. The findings are highly suggestive, and the implications for adjudication are significant.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain the distinction between scientific and moral concepts of responsibility; i.e., the differences between accounts based on causes and those based on reasons for acting.
2. Summarize a number of instances of violent, criminal conduct which seem to arise from pathological disturbances in the brain.
3. Interpret and criticize the concept of "responsibility" in the legal and moral senses of the term.

Outline

I. A litany of clinical findings suggests a correlation between physiological deficits and emotional dispositions. Thus a question arises as to whether such a claim holds true for anger, especially within the context of the insanity defense.

- **A.** One or another form of the insanity defense has been evident throughout recorded history. The very concept of law assumes that a being has sufficient rationality to comport oneself according to the law's requirements. The issue is therefore one of criteria.
  1. In ancient Rome, the standard was one of *non compos mentis* or *furiosus*. This came to be known as the "wild beast" standard. It held until the eighteenth century. For example, in 1723, Rex V. Arnold merely rehearsed the "wild beast" criteria.
  2. In Hadfield, with Erskin as his defender, a novel defense was mounted. Erskin argued that the "wild beast" criterion was far too strong. Thus he suggested that, in light of recent knowledge, the standard for insanity be reformed. The true mark of insanity, he said, is delusion. One therefore judges the behavior as if the delusion were true.
  3. Recently, pre-menstrual syndrome has been asserted as a factor establishing insanity. Unusual responses to toxic substances have also been argued as establishing insanity. In one of the more extreme defenses, a plea of insanity was entered on the basis of excessive Twinkie consumption.
- **B.** Another quite celebrated case is that of John Hinckley. After becoming obsessed with Jodie Foster, Hinckley attempted to get her attention by shooting President Reagan. He pleaded insanity. An important part of his defense consisted of the presentation of physiological evidence showing swelling in the brain. Hinckley's lawyer argued that this swelling was highly correlated with schizophrenia. The defense won, since the prosecution failed to adduce positive evidence for Hinckley's sanity.

II. How is one to make sense of the plethora of insanity claims? The requirement of the ancient courts was quite strong precisely because people do have strong inclinations. In adopting a physiological perspective, courts find themselves at cross-purposes with the very concept of law. Adopting a deterministic outlook makes the rule of law empty. One must balance two extremes in order to preserve justice.

Essential Reading:

Henry Gleitman, pp. 264-69

Supplementary Reading:

Daniel N. Robinson, *Wild Beasts & Idle Humours*, Chap. 6

Questions to Consider:

1. Identify in what instances a physiological condition should be exculpatory.
2. Summarize the State's responsibility to persons deemed insane.

Lecture Thirty
Psychopathology—The Medical Model

Scope: Is all psychopathology, all "mental" illness, finally the consequence of medical or biological disturbances? Is the notion of a "problem of adjustment" simply an expression of ignorance as to the actual biological causes of such problems? Those who answer such questions affirmatively have accepted what is called the medical model of psychopathology. On this account, there are normal physiological processes generating appropriate and adaptive behavior, coherent and effective thought, accurate and realistic perceptions. Disturbances of a biological or chemical nature disrupt these processes and yield "psychological" symptoms that are finally medical symptoms when properly understood.

Severe mental illness is now recognized as arising from significant changes in structure, function and/or chemistry of the brain—specifically, from tumors and improper concentrations of various transmitter chemicals in the brain. The latter conditions have also been traced to genetic predispositions. All told, there is much to support the "medical model," although there is also much to criticize.

Objectives: Upon completion of this lecture, you should be able to:

1. Define the "medical model" and contrast it with the "psychological model."
2. Illustrate how, according to this model, mental illness is only secondarily a problem of adjustment; it is primarily a form of disease arising from conditions in the nervous system.
3. Give examples of psychopathological conditions directly traceable to biochemical or neurological disturbances.

Outline

I. From the perspective of the medical model, there are no psychological problems, only medical maladies. This perspective draws upon clinical findings for support.

- **A.** In a certain context, acetylcholine is a necessary condition for the storage of recently learned material and for the continued representation of events in the external world.
- **B.** Norepinephorin is required for awareness and arousal.
- **C.** Serotonin is correlated with moods and appetites.
- **D.** Dopamine gives environmental events their pleasure-producing quality.
- **E.** GABA is associated with epileptic seizures and tentacle-like involuntary movements.
- **F.** Glutamate is the most widely used in the nervous system. It is a general activator.
- **G.** Endorphins have a pain-attenuating quality.
- **H.** Even subtle changes in the levels of these transmitters can yield relatively large effects within the environmental context. Various transmitter disorders more or less define the boundaries of currently recognized psychiatric disorders.

II. In the nineteenth century, various research projects supported the medical model of psychology.

- **A.** In Germany, Griesinger argued that psychological disease was, at its core, brain disease.
- **B.** In the English-speaking world, Isaac Ray's writings were quite influential in this regard.
- **C.** By the 1880s, the medical model was taken to be more or less definitive.

III. Certain psychological conditions match up nicely with particular physiological deficiencies.

- **A.** Patients suffering from temporal lobe focal epilepsy have a calcified mass in the temporal lobe. They exhibit highly organized, angry, and at times homicidal, behavior. When the seizure state is over, the patients have no recollection of anything that occurred during the seizure. When the mass is removed, the behavior is extinguished. In the face of such evidence, it is difficult to doubt that organized, violent behavior may be the result of a physiological condition.
- **B.** In bipolar disorder, the depressive state becomes trivially manageable with lithium.

C. Some, such as Szaz, have suggested that there can be no mental illnesses, since the mind is not an organ. There is no mental disease, but instead a physiological disorder with psychological symptoms.

D. The heritability of psychological disorders, such as schizophrenia, is often taken as evidence for the medical model. Studies of the heritability of schizophrenia have turned up correlations of 0.6-0.7.

Essential Reading:

Henry Gleitman, Chap. 17

Supplementary Reading:

M. Foucault, *Madness and Civilization*. (1965) New York: Random House

Questions to Consider:

1. Conclude what would prove that a psychological condition had a mental and not a physical grounding.
2. Explain how the law is affected if all psychological disorders are physiological in nature.

Lecture Thirty-One
Artificial Intelligence and the Neurocognitive Revolution

Scope: Psychology in the tradition of philosophical materialism has reached its fullest development in contemporary research and theory of artificial intelligence. If human mental life is based upon and causally achieved by specific processes in the brain—and if these processes can be duplicated by devices designed to function in the appropriate ways—then there is no reason in principle why machines cannot reflect the full range of human cognitive ability. Certain computer programs can "compete" quite effectively with chess masters; other programs serve as "expert systems" for medical diagnosis, and still others are "self-programming" and thus seem to "learn."

What is most interesting in this field is not simply the ability to do well what human beings can do; after all, a $5.00 calculator can "add" faster and more accurately than a professor of mathematics. What is most interesting is the theory according to which entities displaying the same functional capacities are not relevantly different. Thus, if complex, advanced computers with powerful programs can function in cognitive-rational ways that are indistinguishable from human cognition, there would seem to be no relevant difference between the two.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize the perspective now dominant in the field of artificial intelligence (AI).
2. Explain the natural bond between the cognitive, the neurological, and the AI communities.
3. Define "machine functionalism" and the "Turing test" that establishes the relevant similarity of anatomically different things; e.g., persons and computers.

Outline

I. The strong AI thesis argues that machines are, in principle, able to do the sort of things humans do when engaged in behavior regarded as intelligent. If something made up of material components can function in the same way that humans function, the nonmaterialist has very little basis for claiming that humans are not reducible to material components.

II. Several developments provided a foundation for artificial intelligence.

- **A.** In the area of the informational sciences, Shannon and Weaver developed a theory of information. The *a priori* probability of the minimally informing event, e.g., flipping a coin, is .5. This they regarded as a one-bit event.
- **B.** In the computational sciences, the work of the mathematical savant Alan Turing assisted in the formulation of the strong AI thesis. He was developing heuristics for problem-solving. He developed a technique for determining whether a given problem is computable. In order to aid in this project, he created an early computer.
  1. His most recognized philosophical writing sets out the criteria for determining whether a machine would qualify as "intelligent." He suggested that the physical appearance of the machine is irrelevant.
  2. The right kind of test evaluates whether or not the machine's responses are relevantly intelligent. It makes this evaluation on the basis of the degree to which the responses are similar to those of human beings.
  3. Very early on, the AI community began to develop programs for playing chess. Suppose one developed a device that played chess perfectly. Two questions arise: is it playing chess the way masters play? Is chess-playing, which is highly computational, the essence of what it means to be an intelligent human?

III. The machine-functionalist argument is that the machine needs only to function as humans function in order to be regarded as intelligent, rather than having a similar physical appearance or anything else. This is the principle of multiple realizability.

A. Expert systems are machines that function according to heuristics. These programs, as best as possible, copy the steps that particular experts go through in making evaluations. What if such a machine were to succeed in producing outputs indistinguishable from human experts?

B. People in the philosophical community consistently ask questions like, "would these machines have rights?" One must first answer the question of what characteristic establishes a right.

  1. Several rights, such as voting, are based on age. Would not successful machines be at least as capable as an 18-year-old to cast an informed ballot?
  2. Further, what responsibilities would such machines have?

C. Some suggest that this is simply an empirical question, and that we must wait until further developments are made.

D. Others have argued that the data on AI machines are in. Current machines are simply a foretaste of what is to come. Thus, such devices enter into the political realm in which all intelligent beings find themselves.

E. The question must be asked whether a computational device such as this can engage in creative language, as does the *res cogitans*. Where would this meaning come from in such a machine? Nothing in the circuits of a computer seems constitutive of meaning qua meaning. These phenomena are inherently cultural in nature.

Essential Reading:

Henry Gleitman, Chap. 7

Supplementary Reading:

Todd Moody, *Philosophy and Artificial Intelligence* (1995) New Jersey: Prentice Hall.

Questions to Consider:

1. Conclude whether the most "intelligent" computer can be said to be *playing* chess.
2. Explain why, if people guide their actions by heuristics, computers cannot do the same.

Lecture Thirty-Two
Is Artificial Intelligence "Intelligent"?

Scope: The most fully developed version of philosophical materialism is that which gives rise to and is exemplified by the most advanced work in the field of AI. However, compelling arguments have been advanced to the effect that the AI thesis itself is based on a profound misunderstanding of just what "intelligence" is. In this lecture, three major criticisms are developed. One is based on Gödel's "incompleteness theorem," which would limit any and every AI program (but not entities like Kurt Gödel!). Another is based on John Searle's famous "Chinese room," and the third is based on the notion that all meaning is social and contextual, such that machine-operations are and must be quite literally meaningless. On this account, the nature of human intelligence is inextricably bound up with cultural values, historical traditions, shared forms of life, etc. These conditions are neither matched nor matchable within the realm of purely physical events.

Objectives: Upon completion of this lecture, you should be able to:

1. Appraise the AI thesis in light of three general criticisms, learning Gödel's theorem as it applies to any formal system.
2. Explain Searle's critique of the AI program based on his example of the "Chinese room."
3. Summarize the Wittgensteinian sense of meaning as grounded in shared forms of life and common cultures: devices do not enter into such lives and cultures and therefore cannot be "intelligent" in the relevant sense.

Outline

I. It has been suggested that Gödel's theorem delivers a fatal blow to the strong AI thesis. Early in the twentieth century, Gödel established that in any sufficiently complex formal system, the achievements depend upon one axiom that cannot be validated within the system. This is known as Gödel's incompleteness theorem.

- **A.** Computers are certainly complex enough to generate an arithmetic. The very resources of that system thus suffer the incompleteness that Gödel cites.
- **B.** There must be something about the mental life of Gödel that liberated him from the very limitations which he argued were characteristic of sufficiently developed computational devices. Therefore, human intelligence is not an exhaustively computational device.

II. Searle comes at the AI question from another direction. He asks: what exactly is an AI device doing when it is engaged in problem-solving?

- **A.** Searle's "Chinese Room" is analogous to what is going on in the AI machine as it develops a response. The subject in the "Chinese Room" is engaged in mere sorting and compiling according to a given program or instruction.
- **B.** The subject does not understand the "meaning" of the operations. Nothing of an intelligible nature results until an "intelligence" interprets the compilations.
  1. Intentionality, which is at the foundation of all intelligent activities, is missing in any AI device.
  2. The machine is simply a pattern-laying device that cannot garner meaning from the operations. One can never get meaning out of such a system, only more complex, specific compilations.
- **C.** There is also a distinction between following a rule and incorporating a problem as a meaningful part of life. Only humans, and certainly not machines, are capable of the latter. If this striving is an essential mark of intelligence, the strong AI thesis has a quite large obstacle to overcome.

III. The derivation of meanings also poses a difficulty for the strong AI thesis. Meanings arise out of cultural interactions. That is to say, meanings are given by cultural conventions. Meaning, properly understood, is socially constructed.

- **A.** In this regard, what does it mean to play chess? The meaning of playing chess is certainly not given by the simple mechanistic movement of particular pieces according to given rules.

B. According to Wittgenstein, language is a public phenomenon. He illustrates this argument with the famous "beetle in the box" example. Meaning is inextricably bound up with the public practices of a particular culture. This is the only basis upon which a symbol system can come to "mean" anything.
C. Unless a given computational device is engaged in the shared practices of a particular culture, its symbol manipulations are not meaningful. The only given meaning is conferred by the programmer who is within such a cultural context.

Essential Readings:

Gleitman, pp. 211-15

Supplementary Readings:

Moody, op. cit.

H. Dreyfus, *What Computers Can't Do*. (1979) New York: Harper and Row

Questions to Consider:

1. Conclude whether a *society* of computers approximating a human society could be created.
2. Infer whether the Turing test is an adequate test for "intelligence."

Section Five: Psychology and the Social Context

Lecture Thirty-Three
What Makes an Event "Social"?

Scope: There is a long tradition behind the distinction between purely physical events and those that are social or historical. Commentators both ancient and modern have argued that a thoroughly scientific account of an event must finally strip it of all genuinely social or historical features. Accordingly, an attempt to explain such an event scientifically leads not to an explanation but to the elimination of the event itself.

The model offered in place of the scientific one has been called by several names: the "narrative" model, the "hermeneutical" model, the "rational" model, the "teleological" model. What is common under these several denominations is the view that genuinely social or historical events are to be interpreted and can only be thus interpreted from a given perspective or point of view. Only those able to enter into such events by way of imagination or empathy can even recognize their social nature. Thus the form of inquiry proper for an understanding of social phenomena is just what one would bring to bear on historical studies or studies of cultures: a search of patterns of meaning, motivation, aspiration. Nervous systems need not apply!

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize the controversy between scientific and hermeneutical modes of inquiry and explanation.
2. Explain the ontology of the social; i.e., the conditions that must obtain for an event to be "social" in any intelligible sense of the term.
3. Define and give examples of teleological, hermeneutical, and narrative modes of explanation.

Outline

I. Do explanations of social activities require a qualitatively different mode of explanation than the phenomena studied in the physical sciences? Aristotle raises such a question regarding anger.

- **A.** By Aristotle's account, the natural scientist will explain anger on the basis of an increase in the temperature of the blood.
- **B.** If one was to query the angry person, the response would be something of the form, "I was treated unjustly." This mode of explanation is based upon a kind of social understanding. This latter explanation is grounded in a reason and not a cause.
  1. Attempting to explain a social phenomenon solely on a physiological basis disguises the goals and aspirations of the participants.
  2. The right kind of explanation of the Battle of Waterloo makes no essential reference to physiological data. An explanation grounded in physiology eliminates the very category of battles.
  3. Reasons are grounded in a narrative context that is not captured by the physiology of the situation.

II. A number of philosophers have suggested that social phenomena require explanations based on reasons and not on causes. This is a defining characteristic of social events.

- **A.** Aristotle's four-fold theory of causality is informative in this regard. A complete account requires one to include the material cause, the formal cause, the efficient cause, and the final (teleological) cause.
  1. Any good explanation of a social event must give an account of the final cause or the teleology of the context.
  2. The final cause is logically prior to the other causal modalities. It is conceived first, but realized last.
  3. The distinction between acting for a purpose and acting with a purpose is substantial in this regard. Darwinian explanation is teleological in the sense that action is taken to be for a purpose, without the actors acting with a purpose.
- **B.** Social events are only intelligible within a narrative context. This is a characteristic that is never required of explanations in physics. F=ma, for example, makes no more sense than F=ma/3 to beginning physics

students. The laws of physics either work or don't work, but they are not required to be intelligible. Lacking intelligibility, social phenomena are insufficiently explained.

C. Proper explanations of social phenomena must also provide the means for us to empathize with the subject. This empathic quality is what the successful novelist achieves. The plot must be credible. A proper social explanation provides such a plot. Sometimes this form of explanation is referred to as hermeneutical.

Essential Reading:

Henry Gleitman, Chaps. 11, 12

Supplementary Reading:

D.N. Robinson, *Philosophy of Psychology*. (1985) New York: Columbia University Press

Questions to Consider:

1. Explain whether it makes sense to talk of social events as "caused," even if the strongest correlational evidence can be obtained.
2. Explain whether hermeneutics, if it is the proper form for social science to take, is "scientific" at all.

Lecture Thirty-Four
Socialization—Darwin and the "Natural History" Method

Scope: Darwin developed his theory of evolution using what was then called the "natural history" method of inquiry: the method by which the historical life of a species and of its individual members is plotted from over the known course of its existence. The method calls for examining lives within their natural contexts in order to match up the defining features of a species with the conditions faced by individual members of the species.

Evolutionary theory became the overarching framework for psychological perspectives as different as Skinner's and Freud's. The theory, after all, is not merely or even particularly "biological." Rather, it is biosocial in that it explains biological and anatomical characteristics in terms of the broad "social" conditions that favor or oppose them. By "social" is meant those influences and pressures associated with the care and rearing of the young, the tasks of prey and predator, sexual selection within the breeding pool, social organization within the colony, and the like. Forms of emotional expression and behavior are of central importance. Indeed, Darwinian theory explicitly identifies human psychological attributes as falling along a continuum of characteristics shared by all of the advanced species. What is different in human psychology turns out to be a matter of degree rather than of kind. Moreover, the theory understands the fate of the collective and of the individual organism as interdependent. The individual organism must possess attributes which, when they "breed true," enhance the adaptive potential of the collective. Thus does the individual organism carry those traits or instincts that are of general or even universal consequence to the success of the entire species. Much of what the individual organism does for "pleasure" turns out to be vital to the survival of the whole.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize how Darwin's method of inquiry was a form of historical research, quite unlike what is done in laboratories. The "natural history" or "ethological" approach examines animals in the natural context and charts their struggles and achievements over the course of a lifetime.
2. Explain how the careful examination of but a few representative "types," according to the method, provides general principles that apply to the species at large.
3. Illustrate how the resulting explanations are "teleological" in that each defining feature of a species is understood as serving some significant end or requirement for survival.
4. Summarize how the "teleological" nature of Darwinian explanation, however, distinguishes between having a purpose and serving a purpose.
5. Explain how within communities of "social" animals there are instinctual modes of socialization designed to aid in self-defense, predation, mating, and social cohesion.

Outline

I. The great Darwinian achievement did not occur in a vacuum. The eighteenth century was characterized by evolutionary thought, thoroughly focused on the notion of progress.

   A. The medieval world view was highly structured and hierarchical. Departures from the order were seen as a corruption and a deviation.

   B. The impulsion of progress in the Renaissance was quite distinct from structured medieval life. The world was understood in organic terms, not in terms of a static harmony. The universe was seen as highly malleable, an object that could be shaped by humanity.

      1. This Renaissance ideal would become the animating idea of the eighteenth-century Enlightenment.
      2. In a similar vein, the focus shifted from Scripture to science, which led to further understanding and created invention itself.

   C. Freedom was taken to be a kind of prerequisite for progress. This is evident in the works of Adam Smith. Freedom allows for the kind of competition through which the best succeed and propel society.

II. Through his studies on the Beagle, Darwin began to uncover the basic principles of evolution. At the same time, Wallace developed a similar notion of natural selection. It was ultimately agreed that their papers would be read jointly in order to recognize a kind of co-discovery.

- **A.** When it appeared in 1859, Darwin's *Origin of Species* received quite positive reviews. The book was treated in a highly respectful way. Some critics voiced reservations that were primarily scientific in nature.
  1. Selective breeding is a way to hurry evolution, but no new species has ever been developed.
  2. There were few orthodox theological critiques of the theory.
  3. Some scientists claimed that the fossil record did not match up with Darwinian theory.
- **B.** In 1871 and 1872, Darwin offered two decidedly psychological works. These works were highly speculative, supported by a quite thin database. These works were more controversial, incurring criticism from scientific and religious circles.
- **C.** Out of the theory of evolution, we get an emphasis on the collective. The individual organism on the Darwinian account is of interest only insofar as an adaptive, idiosyncratic characteristic contributes to the well-being of the group. Psychology picked up heavily on this trend.

Essential Reading:

Henry Gleitman, Chap. 9

Daniel N. Robinson, pp. 270-304

Supplementary Reading:

Charles Darwin, *Origin of Species* (1859) London: John Murray

Questions to Consider:

1. Explain how one might argue that all science involves some form of the "natural history" method.
2. Conclude whether Darwinian evolution presupposes materialism.

Lecture Thirty-Five
Freud's Debt to Darwin

Scope: Freud developed psychoanalytic theory within the general context of Darwinian theory. Darwin had argued for the essential continuity of human and non-human animal forms of adaptation, taking even the most developed human emotions and intellectual powers to be variations of what is found elsewhere in the animal kingdom. Freud's concept of the "pleasure principle" was designed to explain how it is that the individual organism takes part in just the sort of behavior required for its survival and that of the species.

The psychoanalytic approach is also an example of the "natural history" method in that it calls for a careful examination of the patient's life from the earliest months through childhood, adolescence, and adulthood. It is also "teleological," for the theory is based on the proposition that the universal psychodynamic features of each life reveal principles that serve the significant interests of the collective. Any number of child-rearing practices, no matter how they are "rationalized," actually function to preserve the integrity of the group, foster proper modes of social interaction, and bring the "pleasure principle" (the residual of the animal heritage of the species) under the controlling influences of the "reality principle."

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize how Freud adopted and adapted evolutionary theory within his own psychodynamic framework.
2. Explain how the "natural history" approach becomes the "depth psychology" approach as the patient's personal history is carefully reviewed.
3. Describe how Darwin's theory supplies Freud with an account of how the animalistic nature of the unsocialized infant and child is a residual of evolutionary forces and calls for the process of socialization if the needs and survival of the collective are to be addressed.
4. Explain how Freudian explanations are "teleological" in that the psychological attributes, instincts, and processes are "socialized" to meet the needs of the collective.

Outline

I. Freudian theory owes a large, acknowledged debt to Darwinian evolutionary theory. The Darwinian method was the natural history method. The explanations of natural history attempt to place events within a larger historical framework. Natural history is more than the mere accumulation of data.

II. There is comparability between "depth psychology" and the natural history method.

- **A.** "Depth psychology" tries to get to the reaches of mental life not accessible to the patient. These depths are held to explain the surface features of behavior and social life.
- **B.** Both theories make use of explanations of the "acting for a purpose" mode. The wisdom of nature acts through organisms unconsciously.
- **C.** In both cases, individuals are examined in order to determine characteristics of the entire population.
  - **1.** Nomothetic explanations are framed in terms of general scientific laws. Ideographic explanations have to do with the individual case. This distinction figures prominently in theoretical psychology.
  - **2.** To some extent this contrast pits against each other approaches that may ultimately be compatible. Perhaps by examining the individual case, one can arrive at general principles. The Darwinian and Freudian approaches make use of this compatibility.

III. Instinct is a feature of Darwinian evolution that is central to Freudian psychology. Certain features of human development appear to be instinctual to a great extent. Chomsky's universal grammar is one example of such an innate characteristic.

- **A.** Complex patterns of behavior which Darwin cites as crucial for survival are instinctual. In fact, it is most unlikely that such behaviors are learned, because they are often too complex to be learned by the organism.

B. Freud asked what humans require, prior to any possible learning, in order to survive. Sucking is an example of such an instinctual behavior in infants. Freud postulated that the infant sucks because the behavior is innately sensually/sexually pleasing. Nature has outfitted the organism in this essential way.

Essential Reading:

Daniel N. Robinson, pp. 331 ff.

Henry Gleitman, Chap. 10

Supplementary Reading:

S. Freud, *A General Introduction to Psychoanalysis*. (1952) New York: Washington Square Press.

Questions to Consider:

1. Summarize how the "depth psychologist" can ensure that her explanation is correct, especially in light of competing explanations?
2. Infer whether, under the Freudian account, humans ever act *with* a purpose.

Lecture Thirty-Six
Freud, Breuer, and the Theory of Repression

Scope: Hysterical symptoms are unlike those produced by genuine neurological disorders. They can be moved about under hypnotic suggestion, for example, and they often take a form that violates the known anatomy of the nervous system; e.g., "glove anesthesia." Freud and Breuer discovered that patients given an opportunity to talk at length in the consulting rooms would sometimes enjoy a remission or reduction in their symptoms. They were led to conclude that the symptoms were the physical signs of a blockage of "psychic energy" in the system, the process being controlled by something like the "conservation laws" in physics. On this understanding, Freud proposed that hysterical symptoms were conversion reactions, the "psychic" here being converted to physical form, and that the mechanism was repression. The uncovering of what has been repressed is performed by way of interpreting dreams, acts of forgetting, and certain forms of humor and other "psychopathologies of everyday life."

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize how the practicing neurologist of Freud's time was called upon to diagnose hysterical versus real neurological conditions.
2. Identify some of the symptoms of "hysteria."
3. Explain the "talking cure" (*catharsis*) Freud and Breuer stumbled on and how it provided the basis for their theory of repression.
4. Explain how the prevailing "conservation" laws in the physical sciences were appropriated by Freud in his attempt to explain the mechanism of repression.
5. Relate how dreams, slips of the tongue, and other everyday events may symbolize or disclose what has been repressed into unconscious life.

Outline

I. Freud was heavily influenced by the strong scientific tendencies of the nineteenth century. For example, Freud explained hysteria, in part, on the basis of a principle similar to Helmholtz' principle of the conservation of energy.

II. Freud was confronted in his medical practice with neurological symptoms that could not possibly be grounded in neuro-physiology. One such example is glove anesthesia. The clinical neurologist must distinguish between organic and inorganic neurological disturbances.

- **A.** The term "hysteria" was used to describe neurological symptoms that were not grounded in the neurophysiology of the system.
- **B.** Freud's agenda at the outset was to understand better the nature of hysterias and develop a better way to treat them.
    1. Freud went to France to take in lectures by Charcot on the therapeutic value of hypnosis. Hypnosis is known to have been developed by Mesmer who, like Freud, attended the University of Vienna. Mesmer's ostentation led the scientific community to decry hypnosis as utter nonsense. Charcot found that hypnosis was a useful tool in distinguishing between the organic and the inorganic because hypnosis could not affect the true, neurologically grounded neuropathies.
    2. Freud began using hypnosis, but he soon gave it up for three reasons. First, not everyone could be brought under hypnosis. Second, he said that the therapeutic effect was quite ephemeral. Freud's final and most compelling reason was that the whole process seemed somewhat mystical to him. This last remark is quite illustrative, given that Freud was being educated in a time when the scientific establishment was diligently working to rid science of metaphysical influences.

III. Freud and Breuer gave serious thought to the notion of the "talking cure." They began to develop techniques to get patients engaged in discourse. From this discourse, the patients experienced a period of systematic relief.

- **A.** Freud and Breuer hypothesized that the discourse provided for a release of psychic energy that was previously repressed and had thus brought about particular symptoms.

B. Within this early work there are intimations of the unconscious, as well as the beginnings of techniques such as dream analysis, used to tap the unconscious realm.

Essential Reading:

Henry Gleitman, Chap. 10

Supplementary Reading:

S. Freud, *A General Introduction to Psychoanalysis* (1952) New York: New York University Press (rpt.)

Questions to Consider:

1. Explain to what extent Freud's project diverges from that of the scientific establishment during his time.
2. Conclude whether psychoanalysis is scientific.

Biographical Notes

B. C.

c.a.750 ....**Homer**: The blind poet who composed *Iliad* and *Odyssey,* in which the conditions influencing human thought, feeling, and action are developed.

469?-399.............**Socrates**: The father of that branch of philosophy that is concerned with the human condition, in contrast to the nature of the cosmos and the physical world. His teachings are developed systematically by his greatest student, Plato, in a collection of dialogues.

460?-377?...........**Hippocrates**: The father of Greek medicine whose students, the Hippocratics, practiced a holistic medicine that included dietary, aesthetic, and surgical forms of treatment.

427?-347.............**Plato**: The founder of the Academy in Athens, the first great school of philosophical studies, and the author of more than a score of dialogues that would set the agenda for much subsequent philosophical inquiry.

385-322...............**Aristotle**: The first systematic philosophical psychologist whose writings sought to integrate the biological, psychological, social, and political dimensions of life and to offer a developed theory of personality development as a function of these various influences. His school, the Lyceum, featured an extensive curriculum that included the natural sciences, politics, psychology, and ethics.

372?-287.............**Theophrastus**: Succeeded Aristotle as director of the Lyceum, where he organized the studies for more than three decades. His treatise on *The Moral Characters* is an early "type" theory of personality.

A.D.

130-200...............**Galen**: One of the earliest experimental biologists of the post-classical period. He practiced vivisection on a variety of animals, including pigs whose vocalizations he was able to eliminate by sectioning the recurrent lingual nerve, thus locating vocalization in the brain. His psychobiological theory of the "humours" was influential for centuries.

1515-88..............**Weyer**: Johann Weyer's treatise on witchcraft, *De Prestigiis Daemonum* (1579) was among the first to connect "witchery" to mental disturbances, chiefly melancholy.

1561-1626...........**Bacon**: Francis Bacon's *The Proficience and Advancement of Learning* (1605) signaled the rise of the modern scientific perspective. His *Novum Organum* (1620), the second part of his *Great Instauration*, would serve as something of a bible for the experimentally and scientifically inclined writers of the seventeenth and eighteenth centuries.

1564-1642...........**Galileo**: His astronomical observations and experiments in mechanics supported his writings in the philosophy of science, which proved to be authoritative in overthrowing much of the "old wisdom." His classic *Dialogues Concerning Two New Sciences* (1638) summarizes thirty years of research and the theories supported by it.

1596-1650...........**Descartes**: His research and writing did much to advance biological psychology, chiefly through the concept of reflex mechanisms and the general theory according to which many sensory and motor functions could be explained mechanically. He also defended a form of dualism that denied that the rational operations of the mind were causally brought about by material or biological processes. His *Treatise of Man* (1662) appeared posthumously and is the most "materialistic" of his psychological writings.

1642-1727...........**Newton**: Isaac Newton's *Principia* (1687) established the "rules" for scientific experimentation and theorizing that would be taken as authoritative thereafter.

1632-1704...........**Locke**: John Locke, a friend and great admirer of Newton's, set out in his *An Essay on Human Understanding* to develop something of a Newtonian theory of mind, and a Newtonian approach to the study of mental life in which basic sensations form simple and then more complex ideas by an associational process akin to gravitation.

1748-1832...........**Bentham**: Jeremy Bentham's *Principles of Morals and Legislation* (1789) tied all significant human and animal activity to considerations of pleasure and pain and all morality to considerations of utility.

1758-1828...........**Gall**: Franz Joseph Gall was the father of phrenology and one of the great neuroanatomists of the eighteenth century. His research and writings strongly supported the neurological perspective on psychology. His *Investigations on the Nervous System in General and on that of the Brain in Particular* (1809) was a multivolume contribution that was widely read and translated.

1795-1878...........**Weber**: E.H. Weber, the Leipzig physiologist, carefully studied the sense of touch and the ability of observers to discriminate weights of different magnitude. From these studies he was able to frame the first general law of sensory function, *Weber's Law*, which he published in 1835.

1801-87...............**Fechner**: Gustav Fechner's *Elemente der Psychophysik* (1860) established the experimental methods and overall perspective for research on sensation and perception. The work also includes his derivation of Fechner's Law.

1806-73...............**Mill**: John Stuart Mill did much to advance both empirical psychology and the experimental methods of inquiry. His *A System of Logic* (1843) defended the scientific and experimental approach to "human nature."

1808-82...............**Darwin**: Charles Darwin's *Origin of Species* (1859) and his *Descent of Man* (1871) put an essentially evolutionary psychology on the map of thought and gave impetus to the fields of comparative psychology and developmental psychology.

1817-68...............**Griesinger**: His *Mental Pathology and Therapeutics* (1845) begins with the claim that mental disease is grounded in disease processes in the brain.

1821-94...............**Helmholtz**: The premier scientist of the German-speaking world at mid-century, Helmholtz would advance significant theories on the physiology of auditory and visual functions. The original of his *Treatise on Physiological Optics* appeared in German in successive volumes between 1856 and 1866.

1824-80...............**Broca**: Pierre Broca identified and in 1861 reported the region of the brain which, when destroyed by a lesion, resulted in the patient's inability to speak; so-called Broca's aphasia.

1832-1920...........**Wundt**: The father of experimental psychology, Wilhelm Wundt founded the first university laboratory devoted to the subject in 1879 at the University of Leipzig.

1834-1918...........**Maudsley**: In his *The Physiology and Pathology of the Mind* (1867), Henry Maudsley provided robust clinical data and strong arguments in support of the medical model of mental illness.

1848-1905...........**Wernicke**: Carl Wernicke's clinical observations located the region of the brain which, when diseased, permitted the patient to speak coherently but not to comprehend the spoken word; Wernicke's syndrome.

1842-1910...........**James**: Perhaps the greatest of all psychologists, William James brought an irresistible literary style and great analytical and critical power to bear on the larger as well as the smaller issues in psychology. His *Principles of Psychology* (1890) is still the best systematic introduction to the subject.

1849-1936...........**Pavlov**: The discovery of the "conditioned reflex" and the general theory accounting for it are credited to Ivan Pavlov, who relentlessly advocated a purely biological approach to the issues traditionally regarded as "psychological." He advanced an outline of his position in his Nobel Prize address of 1905.

1850-1909...........**Ebbinghaus**: Hermann Ebbinghaus's *On Memory* (1885) was a pioneering work in the field of memory research.

1856-1939...........**Freud**: The father of psychoanalysis and the most influential psychologist of the twentieth century. With Breuer he published *Studies of Hysteria* in 1896, a prelude to the future theory of hysteria as the outcome of repression.

1857-1911...........**Binet**: Alfred Binet and Theodore Simon published *The Development of Intelligence in Children* in 1905 and helped launch the mental-testing movement.

1874-1939...........**Thorndike**: E.L. Thorndike's *Animal Intelligence* (1898) offered the first published records of the time-course of animal learning and presented the model of "instrumental conditioning" that would be the model of later behaviorist research.

1875-1961...........**Jung**: In his *Psychological Types* (1920) Carl Gustav Jung departs further from the traditional Freudian theory and develops the theory of the introverted and extroverted "types."

1878-1958...........**Watson**: The father of "American Behaviorism," John B. Watson opposed the mentalistic psychologies of his day and advocated as the proper subject of psychological investigation the actual observable behavior of human and nonhuman animals. His famous defense of this position appeared in his article in *Psychological Review* in 1913, "Psychology as the behaviorist views it."

1886-1961...........**Tolman**: E.C. Tolman's *Cognitive Maps in Rats and Man* (1948) summarized numerous and ingenious studies establishing the essentially cognitive nature of problem-solving.

1887-1967...........**Köhler**: One of the fathers of Gestalt psychology, Wolfgang Köhler published his seminal work on *Gestalt Problems and the Beginnings of Gestalt Theory* in 1925.

1890-1958...........**Lashley**: In *Brain Mechanisms in Intelligence* (1929), Karl Lashley offered an early installment of an illustrious career devoted to the study of central mechanisms in learning and problem-solving.

1896-1974...........**Piaget**: Jean Piaget's *The Child's Representation of the World* appeared in 1926 in French, but his influence was much later in the English-speaking world.

1904-88...............**Skinner**: B.F. Skinner's *Behavior of Organisms* appeared in 1938 and was followed by texts and articles establishing him as the major figure in the history of behaviorism.

Glossary

Absolute threshold: The minimum amount of stimulation sufficient to be experienced

Agnosia: The failure to comprehend the meaning or function of things otherwise correctly and accurately perceived.

Anthropomorphism: A form of explanation of non-human attributes in terms of allegedly comparable human attributes. Thus, the formation of ants approaching another colony is explained as an "army" ready to engage in "war."

Aphasia: Either expressive (as in Broca's aphasia) or receptive, the inability to use language.

Apraxia: The inability to perform stereotypical but complex movements such as putting on a jacket.

Anal stage: The second of Freud's stages of psychosexual development; the stage at which bowel functions are associated with sensual gratification.

AI: The acronym for "artificial intelligence."

Artificial intelligence: A form of "intelligent" or problem-solving performance achieved by a programmed computational device.

Basilar membrane: A membrane in the inner ear's cochlear duct along the length of which are the auditory receptor ("hair") cells.

Behaviorism: The theory or perspective according to which observable behavior is the exhaustive subject matter of a scientific psychology.

Biofeedback: The technique for making available to the observer information regarding his or her own physiological states and events; e.g., a visual display of one's own blood pressure or heart rate or skin resistance.

Bipolar: The form of manic-depressive illness in which episodes of both mania and depression occur, as distinct from *unipolar*.

Broca's Aphasia: An expressive aphasia resulting from a lesion in Broca's area, the third frontal convolution in the left hemisphere.

CAT scan: CAT is the acronym for computerized axial tomography; a radiographic technique for constructing three-dimensional anatomical pictures.

Catharsis: In psychoanalytic theory, the release (Gk. *catharsis*) of blocked psychic energy, typically by way of free-association and sustained talk.

Cognitive maps: Tolman's term for the apparent mental or cognitive representation of the external world, such that the rat is able to frame alternative courses of action to reach a desired goal.

Cones: In vision, the retinal receptor cells whose activation takes place in dim and brighter light, though not in darkness; cells that mediate the experience of color.

Conservation:

(a) In psychoanalytic theory, the principle according to which psychic energy in the system is "conserved," though it might express itself in a variety of ways; e.g., it might be expressed in the form of physical symptoms.

(b) In Piaget's theory of cognitive development, a principle that is understood only by older children; the principle according to which, e.g. the quantity of a thing is not changed when it is given a different shape.

Constancy (perceptual): The tendency to see known objects as retaining their known size and shape even as they are moved to more distant locations or are differently oriented; e.g., a saucer seen as round even when presented horizontally.

Conversion reaction: In psychoanalytic theory, the explanation of hysterical symptoms as the result of a conversion of psychic to physical processes.

Depth psychology: Psychological theories based on the concept of the unconscious, otherwise inaccessible at the superficial levels of perception and introspection.

Difference threshold: The minimum difference between two stimuli sufficient for the observer to distinguish between them.

Duplex theory: The theory (fact) that vision is mediated by two functionally different types of receptors, rods and cones; the former activated at the lowest levels of illumination but unable to mediate the experience of color; the latter activated at higher levels of light intensity and associated with the perception of color.

Eudaimonia: In Aristotle's theory that form of "happiness" or "flourishing" that might be achieved by one whose overall form of life is rationally ordered and virtuous.

Ego: The "self" or "I" in psychoanalytic theory, fashioned out of the competing forces of the instinctual and the social.

Empiricism: That philosophical perspective according to which knowledge is grounded in experience, and experience is the ultimate standard of all knowledge claims. It may be contrasted with both rationalism and nativism.

Expert systems: A branch of engineering that seeks to identify the attributes of human expertise (e.g., medical diagnosis) and incorporate them into complex computational programs.

Extrovert: According to Carl Jung, the two dominant personality tendencies are toward extroversion or introversion, each of these forming a "type" of personality which, when known to the psychoanalyst, permits predictions in a wide range of circumstances.

Functionalism: A quite general perspective on biology and psychology according to which various processes or attributes are understood in terms of the functions served by them. Thus, the right question to ask about, e.g., "consciousness," is not what it is, but what it is *for*; what can be achieved by the organism possessing it which cannot otherwise be achieved.

Frontal lobe syndrome: A set of cognitive defects, often involving disrupted perceptions of events taking place over a stretch of time.

Genital stage: The final stage of psychosexual development in which sexual gratification is achieved through heterosexual intercourse.

Glove Anesthesia: A classic form of hysterical symptom in which sensitivity is diminished or lost over the region of the hand that would be covered by a glove, this not being possible as a result of actual nerve damage.

Heritability: The fraction of the total variance displayed by a characteristic that is attributable to genetic sources of variation.

Hermeneutics: Originally reserved to the field of biblical or scriptural interpretation, now used more generally to refer to explanation as a form of interpretation.

Heuristic: A device or scheme that aids in the diagnosis and solution of problems.

Hypnosis: The means or practice by which cooperative subjects can be placed in a state of semiconsciousness or unconsciousness but can still be "reached" in such a way as to alter their perceptions and actions.

Hysteria: Initially, an assortment of temperamental, perceptual, and behavioral abnormalities thought to be associated with childbirth and other gender-specific conditions; hence the word, which is a version of the ancient Greek for *uterus*; later referring indifferently to men and women displaying such perceptual, behavioral and emotional disturbances.

Id: In Freud's theory, the basic, instinctual core of drives inherited as part of the animal ancestry of the human race; tendencies toward self-gratification and self-preservation without the regulative influences of civilization.

Instinct: A typically complex pattern of behavior (i.e., unlike reflexes) exhibited (nearly) universally within a species or by one gender in that species, and appearing in essentially complete form without the benefit of practice or training.

Instrumental conditioning: The term used to designate conditioned behavior that is instrumental in problem-solving or in reaching a goal; as distinct from reflexes.

IQ: The "intelligence quotient" calculated by dividing mental age by chronological age and multiplying by 100. A 10-year old who scores at the mental level of the average 12-year old has an IQ of 120 (12/10 X 100).

Lateralization: The tendency of certain perceptual or behavioral capacities to be localized in one but not both halves of e.g., the cerebral cortex. Thus, lesion in the left hemisphere leads to paralysis on the right side of the body, etc.

Law of effect: Thorndike's law, stating that behavior is strengthened or weakened by the effects it produces; behavior leading to a "pleasing state of affairs" thus becoming more likely; that leading to pain or punishment, less likely.

Limbic system: In highly integrated collection of structures below the cerebral cortex and having strong associations with basic emotional patterns of behavior such as copulation, aggression, maternal activity, etc. The structures include the amygdala, the septum, the Isle of Rile, the hippocampus and the columns of the fornix.

Machine functionalism: A concept in contemporary philosophy of mind that would equate intelligence or cognition not with a specific anatomy (e.g., the brain) or type of animal (e.g., human) but with any generic device able to perform intelligent or cognitive functions.

***Malleus Maleficarum*:** "The hammer of evils" was *the* book in the fifteenth century that informed courts on the procedures for identifying witches and the punishments to be imposed on them. Written by two Dominicans (Sprenger and Kramer) it offered a perilous mixture of science, pseudo-science, and rank superstition.

Manic-depressive: A form of psychosis; a severe mental illness in which the sufferer experiences delusions and is overcome by episodes of uncontrollable and even suicidal depression and/or destructive forms of mania.

Materialism: That philosophical school or system that takes the ultimate reality to be a material reality, finally lacking in any other kind of "stuff"—notably "mental" stuff.

Mnemonic: A technique for aiding memory.

Nativism: A psychological orientation or theory according to which certain mental or cognitive powers are innate, requiring only time for maturation before expressing themselves in their full form.

Neo-Freudian: The member of a psychoanalytic school or system indebted to Freudian theory but departing from it to a greater or lesser extent.

Noise: A technical term referring to any event or entity that interferes with the detection of a target-stimulus.

Nomological-deductive model: Developed and defended by Carl Hempel, a model of scientific explanation based on the proposition that an event has been explained scientifically when it is shown to be deducible from a general law (Gk. *nomos* = law)

Nonsense syllables: Used by Hermann Ebbinghaus in his pioneering studies of associative memory processes. Typically, such syllables are formed by a consonant-vowel-consonant sequence such as MIB, TUJ, etc.

Ontology: The branch of metaphysics addressed to questions regarding real or actual being. Whether or not there are actually existing minds or consciousness or thoughts (as distinct from matter) is an *ontological* question.

Operant: Skinner's technical term for an observable musculo-skeletal movement.

Oral stage: The first stage in Freud's theory of psychosexual development; the stage at which sensual gratification is achieved by oral stimulation, such as sucking.

Ossicles: The three bones of the middle ear which translate motion from the ear drum to the cochlear duct of the inner ear.

Payoff matrix: In general, the costs and benefits of various decisions and decision-strategies; in signal detection theory, the costs assessed against either false alarms or missed targets.

Phallic stage: The stage of psychosexual development when sexual gratification is achieved through genital self-stimulation.

PET scan: The acronym stands for *positron emission tomography*. Radioactively tagged elements are introduced into the blood supply to the brain so that the rate of oxidation in various regions can be monitored in real time, thus providing a record of activity in specific regions.

Pitch: The auditory sensation associated with the frequency of sound.

Physiognomy: The pseudo-science of Lavater, which promised to reveal basic personality and moral characteristics by the close study of facial types.

Pleasure principle: Freud's term for the controlling influence that modes of sexual gratification have on behavior; a principle grounded in the ancestral and instinctual animal pleasures and tied to survival and procreation.

Positivism: A philosophical defense of scientific modes of inquiry as the only source of valid knowledge. The "positive" knowledge of science is contrasted with superstition, religious faith, and untestable intuition.

Psychosexual development: Freud's conception of the maturation of sexuality from the nourishment-based instincts of infancy to adult procreative sexuality; a maturation in which basic instinctual inclinations are "socialized" by the adult community.

Rationalism: A term used somewhat imprecisely to cover various philosophical positions and systems that may have little in common; but generally covering philosophical arguments to the effect that all valid knowledge must be in the form of rationally intelligible and integrated ideas rather than the disjointed facts of bare experience.

Reality principle: As used by Freud, a concept covering the socialization and civilizing of those impulses grounded in the Pleasure Principle.

Receptors: Specialized cells that respond selectively to particular classes of physical or chemical stimuli. The rods and cones of the retina and the hair cells of the inner ear are examples.

Repression: In psychoanalytic theory, the mechanism or process by which unacceptable thoughts and desires are kept out of consciousness and are driven (repressed) into the recesses of the unconscious.

ROC curve: The acronym stands for *receiver operating characteristics* and refers to the performance of a detection system. The curve is a plot of the rate of false alarms against the rate of "hits."

Rods: Receptor cells in the retina, sensitive to the lowest levels of visible illumination but not associated with the color-sensing mechanisms of the visual system.

Schizophrenia: A form of psychosis characterized by hallucinations, delusions, and thought so disordered as to prevent a rational form of life.

Span of apprehension: The maximum number of items that can be kept in immediate memory after a brief exposure. In the absence of special "priming" techniques, this number is on the order of 7 or 8.

Split brain: A term referring to the surgical disruption of pathways that join the two halves of the brain.

Structuralism: In the modern history of psychology, this term was used to describe that program of research and theory devoted to unearthing the structure of mental life; the sensations, images, feelings, and interactions among these giving rise to mental life.

Superego: In psychoanalytic theory, the equivalent of "conscience."

Teleological: An explanation of an event or thing based on the purpose or goal (Gk. = *telos*) achieved as a result of that event or thing. The long neck of the giraffe is teleologically explained when the attribute is connected to the nutritional requirements of the species and the altitude of needed vegetation.

Unconscious: As distinct from non-conscious or the medical sense of "unconscious", the psychoanalytic concept of a dynamic realm of motives and conflicts, outside the reach of consciousness, but shaping conscious behavior.

Unipolar: The form of manic-depressive illness in which mood swings are generally absent and the patient is either in one or the other phase of the disorder. Depression is the more common form of unipolar manic-depressive disease.

Timeline

B.C.

ca.750..................Homer's *Iliad* and *Odyssey*

399..................Socrates chooses death over dishonor

400..................Hippocrates flourishes

367..................Plato founds the Academy

335..................Aristotle founds the Lyceum

322..................Theophrastus succeeds Aristotle as director of the Lyceum

A.D.

180................Galen undertakes research on the nerves in relation to behavior

1579 ....Johann Weyer's *De Prestigiis Daemonum* published

1605................Francis Bacon's *The Proficience and Advancement of Learning*

1609................Galileo observes the moons of Jupiter

1644................Descartes's *Principles of Philosophy*

1687................Isaac Newton's *Principia*

1690................John Locke's *An Essay on Human Understanding*

1789................Jeremy Bentham's *Principles of Morals and Legislation*

1809 ....Franz Joseph Gall's *Investigations on the Nervous System in General and on that of the Brain in Particular*

1835................Weber's Law

1843................John Stuart Mill's *A System of Logic*

1845................Griesinger's *Mental Pathology and Therapeutics*

1856................The first volume of Helmholtz's *Treatise on Physiological Optics*

1859................Darwin's *Origin of Species*

1860................Fechner's Law

1861................Pierre Broca identifies "Broca's area"

1867................Henry Maudsley's *The Physiology and Pathology of the Mind*

1879................Wundt establishes the psychology laboratory at Leipzig

1885................Ebbinghaus's *On Memory*

1890................William James's *Principles of Psychology*

1896................Freud and Breuer publish their *Studies of Hysteria*

1898................E.L. Thorndike's *Animal Intelligence*

1900................Freud's *The Interpretation of Dreams*

1905................Ivan Pavlov gives Nobel Prize address

1905................Alfred Binet and Theodore Simon publish *The Development of Intelligence in Children*

1913................John Watson's "Psychology as the behaviorist views it"

1920 ....Carl Jung's *Psychological Types*

1925................Wolfgang Köhler's *Gestalt Problems and the Beginnings of Gestalt Theory*

1926.................Jean Piaget's *The Child's Representation of the World*

1929 ....Karl Lashley's *Brain Mechanisms in Intelligence*

1932................E. C. Tolman's *Purposive Behavior in Animals and Men*

1938................B. F. Skinner's *Behavior of Organisms*

1948................E. C. Tolman's *Cognitive Maps in Rats and Man*

1954................James Olds publishes *Studies of Reward and Punishment Centers in the Brain*

1956................Solomon Asch's "Studies of independence and conformity"

1959................Noam Chomsky reviews Skinner's *Verbal Behavior*

1963................Lawrence Kohlberg's "Development of children's orientations toward a moral order"

1963................Stanley Milgram, "Behavioral study of obedience"

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Barnes, J. *Early Greek Philosophy*. (1987) London: Penguin. (The pre-Socratics and the overall intellectual context from which Plato's works would depart and also on which they would depend to some extent.)

Borst, C.V. ed. *The Mind/Brain Identity Theory*. (1970) New York: St. Martin's. (Seminal essays on the mind/body problem by leading thinkers.)

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Dreyfus, H. *What Computers Can't Do*. (1979) New York: Harper and Row (Dreyfus argues that "intelligence" figures in all we do, cannot be reduced or modularized, nor can it be extracted from the contexts in which it invariably functions.)

Dunker, K. "On problem solving." 1945, *Psychological Monographs*, No. 270, 113 pp. (Dunker's classic treatise on the logic of problem-solving and its ineradicably cognitive nature.)

Ebbinghaus, H. *Memory: A Contribution to Experimental Psychology* (1885). (1964) New York: Dover (reprint) (The classic work on associative learning and memory; the foundational work.)

Eccles, J.C. and Robinson, D.N. *The Wonder of Being Human: Our Mind and Our Brain*. (1984) New York: Free Press. (A critique of materialistic theories of mind and of attempts to reduce the mental to the physiological.)

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Ginzburg, C. *Ecstasies: Deciphering the Witches' Sabbath*. (1991) New York: Pantheon. (The cultures of superstition and punishment regnant in the Renaissance.)

Gleitman, H. *Basic Psychology* (3d ed.) New York: Norton, 1992. (The essential text for the course).

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Hempel, C. *Aspects of Scientific Explanation*. (1965) New York: Free Press. (Essays in defense of the nomological-deductive model of science and replies to critics.)

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Hume, D. *A Treatise of Human Nature* (1739) L.A. Selby-Bigge, ed. (1965) New York: Dover. (One of the most influential treatises in defense of the empirical theory of knowledge.)

Kenny, A. *Aristotle on the Perfect Life*. (1990) Oxford: Oxford University Press. (Aristotle's perfectionist scheme of life and its dependence on the larger context of the polis.)

Kohlberg, L. ed. *The Psychology of Moral Development*. (1984) San Francisco: Harper and Row. (Kohlberg's theory and replies to critics; summaries of major findings, defenses and explanations of the methods.)

Köhler, W. *The Mentality of Apes*. (1927) New York: Harcourt Brace (A classic in the tradition of Gestalt psychology, summarizing studies of insight and problem-solving by the great apes.)

Köhler, W. *Gestalt Psychology* (1947) New York: Liveright. (Basic principles of Gestalt psychology set forth by the master of the school.)

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Lamiell, J. *The Psychology of Personality*. (1987) New York: Columbia University Press (A sustained critique of the nomothetic approach to assessment and a defense of person-oriented theories.)

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Loftus, E. *Eyewitness Testimony* (1989) Cambridge: Harvard University Press (The leading researcher summarizes the factors that lead to misidentification and false alarms.)

Mather, C. *On Witchcraft.* (1662/1991) New York: Dorset (Cotton Mather's confident theory and relentless assaults on those who would be different.)

Milgram, S. *Obedience to Authority.* (1974) New York: Harper & Row (The famous studies of obedience are discussed by the man who made them famous.)

Mischel, W. *Introduction to Personality*, 4th ed. (1986) New York: Holt, Rhinehart and Winston. (A standard text in the field, rich in detail and explanation.)

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Penfield, W. *The Mystery of the Mind* (1975) Princeton: Princeton University Press (The greatest neurosurgeon of the 20th century discusses the implications of a lifetime of probing the recesses of the human brain in patients able to reflect "on-line"!)

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Robinson, D. ed. *Social Discourse and Moral Judgment.* (1989) San Diego, California: Academic Press (Essays by leading psychologists and moralists on the nature of morality and the conditions under which it is exercised and understood.)

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Rosenhan, D. "On being sane in insane places." 1973 *Science*, vol. 179, pp. 250-58. (Once committed, Rosenhan and his colleagues were treated as mental patients, no matter how they behaved!)

Rosenthal, A.M. *Thirty-eight Witnesses*. (1964) New York: McGraw Hill. (Kitty Genovese was left without help by thirty-eight eyewitnesses as her assailant proceeded to kill her.)

Rock, I. *An Introduction to Perception* (1975) New York: Macmillan (A good treatment of the subject; not so technical as to require prior study.)

Sherif, M. et al., *Intergroup Conflict and Cooperation*. (1961) Norman: University of Oklahoma Press. (The Robbers' Cave experiments and their implications.)

Skinner, B.F. *Science and Human Behavior*. (1953) New York: Macmillan (A classic statement of the modern behavioristic perspective by the man who fashioned it.)

Skinner, B.F. "Can psychology be a science of the mind?" 1990, *American Psychologist*, vol. 45, pp. 1206-10. (The "mind," as redone by the leader of behavioristic psychology.)

Skinner, B.F. *Beyond Freedom and Dignity*. (1971) New York: Knopf (The world as it should be, according to B.F. Skinner; NO PRAISE—NO BLAME!)

Segall, M. et al. *The Influence of Culture on Visual Perception*. (1966) New York: Bobbs Merrill (The "carpentered world" of the West yields perceptual tendencies different from those found in less structured places.)

Shepherd, R. *Mind Sights*. (1990) New York: Freeman (Mental rotation and other rich cognitive events are discussed with insight and suggestively.)

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Tolman, E.C. "Cognitive maps in rats and man." 1948, *Psychological Review*, vol. 55, pp. 189-208. (Rats know more than they reveal—until the research gives them a chance to show it!)

Tulving, E. and W. Donaldson, eds. *Organization of Memory*. (1972) New York: Academic Press (An excellent introduction to the manner in which memory is studied and understood in the post-associationistic period.)

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Wolpe, J. *The Practice of Behavior Therapy*. (1973) New York: Pargamon (The behavioristic approach to defining and treating "neurotic" disorders; Freudians need not apply.)

The Great Ideas of Psychology

Part IV

Professor Daniel N. Robinson



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Daniel Robinson is professor of psychology at Georgetown University, where he has taught since 1971. Although his doctorate was earned in neuropsychology (1965, City University of New York), his scholarly books and articles have established him as an authority in the history of psychology, philosophy of psychology, and psychology and law. He holds the position of adjunct professor of philosophy at Georgetown and, since 1991, he has lectured regularly for the sub-faculty of philosophy at the University of Oxford.

Dr. Robinson's books include *The Enlightened Machine: An Analytical Introduction to Neuropsychology* (Columbia, 1980), *Psychology and Law* (Oxford, 1980), *Philosophy of Psychology* (Columbia, 1985), *Aristotle's Psychology* (1989), *An Intellectual History of Psychology* (3rd ed., Wisconsin, 1995) and *Wild Beasts & Idle Humours: The Insanity Defense from Antiquity to the Present* (Harvard, 1996). Dr. Robinson has served as principal consultant to the Public Broadcasting System for the award-winning series "The Brain" and the subsequent nine-part series, "The Mind." He is past president of two divisions of the American Psychological Association: the division of the history of psychology and the division of theoretical and philosophical psychology. He is fellow of the American Psychological Association and of the British Psychological Society. Dr. Robinson is also visiting senior member of Linacre College, Oxford.

The Great Ideas of Psychology
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The Great Ideas of Psychology

Scope

These forty-eight lectures examine the conceptual and historical foundations, the methods, the major findings, and the dominant perspectives in psychology. The subject is vast. The lectures are designed to achieve balance between basic processes and real-life issues; between the "hard science" and "soft science" of psychology; between the personal and the social; between the normal and the deviant.

In addition to a critical review of major findings and theories, the lectures examine several controversial issues arising from or illuminated by psychological research and theory. Included among these are the issue of "nature" versus "nurture"; theories of genetic or behavioristic or biological determinism; theories of moral relativism and absolutism; sex "roles" and gender stereotyping; the place of psychology within the legal system (e.g., in predicting violence, establishing competence, or determining whether or not a defendant is sane).

Although psychology and kindred disciplines help to clarify such issues, the lectures will point to the limitations imposed on any purely scientific or empirical approach to matters of this sort.

Objectives

The student will be able to:

1. Identify the broad historical and conceptual foundations of psychology from its origins in classical philosophy to the present;
2. Identify the major research methods and findings that characterize contemporary psychology;
3. Explain the principal claims and the main points of contention between and among the major schools and systems of psychology, including the behavioristic, the psychoanalytic, the neurocognitive, and social constructionist;
4. Explain the dependence of these issues on the larger framework bequeathed by the history of ideas.

Lecture Thirty-Seven
Freud's Theory of Psychosexual Development

Scope: At the heart of Freud's theory are those evolutionary and ontogenetic processes that serve the interests of the species and the individual. These processes often pit against each other the individual quest for gratification and the requirement that such quests conform to the needs of the collective. The theory of psychosexual development holds that the individual progresses from infantile stages of sexual gratification (sucking as "oral gratification," but serving the needs of the body) to adult heterosexual sexuality (an intensely pleasurable act but one that serves the interests of the collective). At each stage the process of socialization is at work, designed to reward or to move the individual along to more mature stages—a socialization that can be traumatic and that can instill guilt and feelings of rejection. The seeds of adult disorders are planted when one becomes arrested within a lower stage of psychosexual development. All later neurotic symptoms are seen as remnants of childhood traumas associated with psychosexual development.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize how Freud regarded his theory as derived from evolutionary theory and as a scientific theory in its own right.
2. Summarize how psychoanalytic theory is a theory of the development of personality—a developmental theory—that is biosocial from first to last.
3. Explain how the tension between the instinctual impulses (the Id) and the socialization of these tendencies (the superego) is a lifelong affair and one in which neurotic disturbances are grounded.
4. Identify how psychoanalysis is a form of "re-education," designed to have the patient relive the earlier traumatic experiences and learn to cope with them now at a conscious level.

Outline

I. Freud was quite sensitive to criticisms that his theory of psychosexual development was too theoretical. Much of his early intellectual life was spent under Mach and positivism.

II. Throughout the psychosexual domain, nature makes pleasant those activities that will aid in the survival of the organism. Freud regarded this as the pleasure principle. Such a principle appears to be at work throughout the animal kingdom. In human society, there are inhibitions to pursuing pleasure. Freud tried to understand the purely naturalistic drives within the context of a complex society.

- **A.** Gratification for the infant is oral in nature. The infant experiences pleasure through engaging in sucking behavior.
- **B.** The proximate stage is the anal stage. In this stage, the child begins to grapple with an external world. Therefore, this stage is crucial in guiding the child toward a particular pattern of interactions with others.
- **C.** Throughout the phallic and genital stages, the person is driven by forms of gratification that are conducive to human procreation. Reproduction of the species is the goal of psychosexual development. This is not to suggest that the conflict between the pleasure and reality principles is resolved. This struggle persists from the anal stage throughout one's life.
- **D.** The quite natural target for one's sexual energies is the most frequent source of one's gratification, which from infancy is most often the mother. To account for this, Freud offers the oedipal complex.
  1. Socialization forces one to find a surrogate for these mounting sexual energies. Either this tension will be resolved or it will plague one's entire life.
  2. Often the oedipal conflict results in overly paternalistic or effeminate types of character.

III. By what means is the psychoanalyst able to access the subconscious?

- **A.** Freud suggested that the contents of dreams were representative of the contents of one's subconscious. Thus, through the analysis of dreams, the contents of the subconscious are accessible.

B. There is a constant battle between the pleasure-seeking id and the conforming superego. The ego makes sense of this conflict and gives identity to the person. This identity often has to be defended from impulses by means of ego defenses. Where these ego defense mechanisms are most fully engaged, the neurosis begins to appear. When the integrity of the ego is violated, more severe forms of neuroses arise.

Essential Reading:

Henry Gleitman, Chap. 10

Supplementary Reading:

S. Freud, *op. cit.*

Questions to Consider:

1. Explain to what extent Freud's emphasis on the psychosexual domain is limiting.
2. Conclude how, if the mind is explained by the id, ego, and super ego, those latter facets of mind are explained?

Lecture Thirty-Eight
Critiques of Freudian Theory and Alternatives to It

Scope: Freud's biological orientation led him to conclude that psychodynamic processes are universal and largely independent of culture and society. The neo-Freudians (such as Adler), not to mention the anti-Freudians (such as the behaviorists), have rejected such absolutes and have emphasized the social and cultural context as the source of personal development. Anthropologists such as Margaret Mead and Bronislaw Malinowski challenged Freud's contentions about the universality of toilet-training practices, oedipal tensions, and kindred psychoanalytic certitudes. Others have noted that even Freud's patient-samples reflected a late-Victorian culture long since past. As a result, the classical "hysterias" are now quite uncommon. Contrary to Freud's essentially biological stages of psychic development, others have emphasized social stages. Erik Erikson, for example, offers an eight-stage theory beginning with the infant's attachment to mother (the grounding of trust in later life), and culminating in the final years either in integrity or in despair as one's lifetime is reviewed for meaning and purpose.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize how certain Freudian "absolutes" do, in fact, display cultural variations.
2. Explain how Freud's own patient-population may itself have arisen from cultural rather than fixed biological factors.
3. Define the neo-Freudian schools that emphasize the social and cultural roots of personality and personal adjustment.

Outline

I. Freud was very hostile toward those who criticized psychoanalytic theory. He was well aware that he was attempting to launch a movement which, if it were to succeed, would inevitably have to prosper within a politicized setting.

II. The anthropological record is not as consistent as is required by psychoanalytic theory. Rearing practices are quite diverse in ways not compatible with Freudian theory. As conceived by Freud, psychoanalytic theory overemphasizes the biological nature of human beings.

- **A.** The neo-Freudian movement was highly sensitive to the role of culture within a meaningful human life. For Freud, the highest form of human life was displayed by those who lived in accordance with the biology of the system. The neo-Freudians recognize the significance of the interactions between the individual and the society.
- **B.** Erikson's theory illustrates an alternative theory that recognizes the primacy in social interactions in defining the individual.
  1. In the earliest months of life, the infant demonstrates a definite attachment to the countenance of the mother.
  2. In the next stage, the child begins to exhibit autonomy.
  3. From ages three to six, the child begins to take initiative and reorder the way in which the world appears to him or her. This social learning is foundational for the subsequent adult personality. Reference to instincts and biology cannot account for these social phenomena.
  4. Between ages six and twelve, the child develops competence. Competence is extraordinarily important in the formation of character. Competence provides an encouraging sort of feedback and supplies the young child with the notion that good things occur only with the fullness of time.
  5. Adolescence is the next stage in development. This stage allows the individual to try out different roles. It is a tumultuous period, but it is also the training ground for a social and civic life.
  6. The stage of early adulthood is characterized by intimacy or isolation. This is the source of serious problems for early adults.

7. Middle adulthood is a stage in which the individual is either stagnant or productive. This is not a mechanized productivity, but a fluid notion. Productivity means that one is engaged by and in the world. One's resources are being deployed toward some end.
8. Later life is characterized by either integrity or despair. Integrity is the continuing integration of the most important features of one's life. Despair is the opposite. One is utterly defeated after a life of which she is disappointed.

Essential Reading:

Henry Gleitman, Chap. 14

Supplementary Reading:

E. H. Erikson, *Dimensions of a New Identity*. (1974) New York: Norton

Questions to Consider:

1. Infer whether all human actions are inescapably social.
2. Conclude whether Erikson's theory of development is overly polarized. That is to say, to what extent do the conflicts he cites comprehensively account for life's transitions?

Lecture Thirty-Nine
What *Is* "Personality"?

Scope: Freud, the neo-Freudians, and others have written at length about the development of the adult personality and about the disordered or maladaptive personality. But what *is* "personality"?

The notion of personality "types" is ancient. Theophrastus actually depicted them in the form of characteristic faces and facial expressions. The term is generally used to describe more-or-less stable traits of character that are held to predict the person's behavior in a wide variety of contexts and over a long period of time. Thus one is said to be "amiable," "hostile," "sensitive," or "ambitious." Because of this stability, some have assumed personality to be largely an outcome of heredity and tied to an underlying set of biochemical or neurological states and predispositions. Social learning theorists, however, have accounted for the persistence of certain "traits" in terms of conditioning and the imposition of various social roles; e.g., "manliness" as the result of sex typing practices. But there are well known gender-specific tendencies (e.g., aggression) displayed by males in cultures that are widely divergent in their rearing practices. The same tendencies are observed in the very young and even in non-human species. Thus theories of a decidedly cultural or environmentalistic nature are challenged by at least some of the findings.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain in what sense the very concept of "personality" is ambiguous and probably too general for theoretical purposes.
2. Summarize why specific persons do seem to display fairly consistent patterns of emotionality and conduct even in very diverse settings and over long periods of time; that is, they seem to instantiate given personality "types."
3. Explain "physiognomy" as an early attempt to identify certain "types" of character or personality, and discuss certain type-theories that have thrived ever since.
4. Explain how social learning theory is an alternative to such theories but, again, that there do seem to be strong hereditary predispositions at the foundation of personalities.

Outline

I. "Type" theories of personality take human identity to be more or less stable, as opposed to the sort of theory offered by Locke, in which identity is derived from experience.

- **A.** Even as early as ancient Greece, "type" theories of personality have been offered in one form or another.
  1. Theophrastus, for example, suggested that individuals could be described by a relatively stable set of dispositions. These dispositions are not merely accidental, but they are intrinsically tied to the person.
  2. Within Greek tragedy, a more metaphysical notion of personality was described. Personality was taken to be a kind of curse, a mark for one's actions that was rolled down through the ages.
- **B.** In the eighteenth century, the psychology of personality was undertaken from a scientific perspective.
  1. In this regard, Lombroso began to suggest there were particular characteristics of the so-called criminal personality.
  2. Gall offered phrenology as a means of determining the personality characteristics of a given individual.
  3. Lavater offered the science of physiognomy in which facial characteristics were taken to represents the various types of personalities.
- **C.** According to the the majority position among current personality psychologists, there are five major personality types. The 'big five" include:
  1. Neuroticism, which is characterized by tension and anxiety
  2. Extroversion, a characteristic of someone who is outgoing—the "life of the party"
  3. Openness, characterized by intelligence and creativity manifest in a non-judgementalism
  4. Agreeableness, seen in one who is always making concessions and avoiding conflict

5. Conscientiousness, describable as reliable and dutiful.

II. "Type" theories of personality are often criticized by those in the domain of social learning theory who argue that the role of biology and genetics, as regards personality, is quite limited. The question of gender differences in personality may be illustrative in this regard.

Essential Reading:

Henry Gleitman, Chap. 14

Daniel N. Robinson, *Intellectual History*, chap. 3

Supplementary Reading:

W. Mischel, *Introduction to Personality*, 4th ed. (1986) New York: Holt, Rhinehart and Winston

J. Lamiell, *The Psychology of Personality*. (1987) New York: Columbia University Press

Questions to Consider:

1. Describe the limitations of "type" theories of personality.
2. Infer to what extent "type" theories can be useful in understanding *individuals*.

Lecture Forty
Obedience and Conformity

Scope: Solomon Asch and Stanley Milgram performed now-classic experiments illustrating the powerful influence of the social context on conduct. In Asch's study, a person's judgment of the length of a line could be significantly altered and predicted simply by arraying against him the judgments of others in the group. Milgram demonstrated the relative ease of having ordinary, decent citizens engage in an activity thought to be a source of pain and danger to innocent others.

The importance of this research is based on the challenge it offers to both of the dominant theories of personality: the biogenetic theory of "types" and social learning theory. If features of the social context can so determine significant courses of action, how useful is it to think of personality as stable or fixed either by conditioning or by heredity?

Objectives: Upon completion of this lecture, you should be able to:

1. Illustrate the methods and findings in several classical studies of conformity.
2. Explain how the best predictor of behavior in complex settings are the demand-characteristics of the setting, not the "type" of personalities present at the time.
3. Summarize the limitations and incompleteness of biogenetic and learning-theories of personality.

Outline

I. Several studies of behavior in a social setting have suggested the extraordinary power of context in shaping individual actions. Exploration of the role of context is invaluable to the question of personality. Something in the context has a trumping power over "personality" or reinforcement history. One group of studies was performed by Asch on the way a group setting may affect judgement.

- **A.** Asch gave a subject a set of three lines out of which she was asked to choose that line which matched a fourth line. Not surprisingly, the subjects in this setting had less than a 5% error rate.
- **B.** When the subject was placed in a group with collaborators who chose the wrong line, the error rate increased dramatically. Peer pressure had apparently shifted the judgement of the subject.

II. In Milgram's famous studies of obedience, the subject was told that a learning experiment was being performed and that she would be required to shock a "volunteer" when an incorrect answer was given. As more incorrect answers were given, the voltage was supposedly turned up to a point where the dial read "danger" and screams could be heard.

- **A.** Surprisingly, two-thirds of the subjects completed the study. Some showed reluctance, but given a firm request, most subjects complied despite outwardly visible stress.
- **B.** The authority under which the subjects perceived themselves was in a majority of cases so compelling, that the subjects volitionally completed the study.
- **C.** The Holocaust and the case of Kitty Genovese provide parallel examples in which something in the context led to inaction in the face of an egregious violation of rights.
- **D.** Milgram's study raises several ethical questions about the misinformation of subjects and because of the high stress levels that were endured.

III. In a study by Zimbardo, undergraduates at Stanford were selected to act as prisoners or guards. The guards were told simply that they had to preserve order. The study had to be called off because of abusiveness by the guards and utter dependency displayed by the prisoners.

- **A.** Participants in the study were absolutely absorbed by the context and played to the extremes of their assigned roles.
- **B.** One must ask ethical questions about Zimbardo's study given the consequences for the participants. One must also begin to ask, "How should we raise our children with regard to authority?"

IV. Plato's story of the Ring of Gyges holds that humans, when freed from the fear of punishment, are capable of the most offensive actions. As regards our conduct, the important question is not hinted at by any of the above studies. Knowing what we do is not nearly as important as knowing what we should do.

Essential Reading:

Henry Gleitman, Chap. 12

Supplementary Reading:

S. Milgram, *Obedience to Authority*. (1974) New York: Harper & Row

Questions to Consider:

1. Conclude what the above findings suggest about traditional perspectives on personality.
2. Infer what it is about human nature that gives such extraordinary power to social context.

Lecture Forty-One
Altruism

Scope: Against the view that significant human actions have selfish and self-regarding motives, many actions—those of so-called "saints" and "heroes"—seem to have a strong altruistic motivation, as do actions by many non-human animals. Dolphins, for example, have often been credited for aiding humans in distress, and in recent times a zoo gorilla has been filmed rescuing a human child. Even that arch-defender of the theory of evolution, Thomas Henry Huxley, saw altruism—the willingness to sacrifice oneself for the greater good—as a challenge to evolutionary theory.

Analysts have identified several contextual factors that influence or discourage altruistic behavior. These factors include the presence of others, and how those others behave when some course of action seems necessary. The sheer size of the group seems to be a powerful influence against altruistic behavior. The more people are present, the more does responsibility appear to be diffused, and the less likely is personal initiative. Nonetheless, persons having highly developed self-perceptions tend to define contexts differently and rise above them.

Objectives: Upon completion of this lecture, you should be able to:

1. Describe how context is a powerful influence on behavior.
2. Summarize how, even though "saints" and "heroes" are not self-regarding, evolutionary theory still offers an account of them.
3. Explain how a reference group helps to diffuse responsibility and thus render the individual less committed to action.
4. Outline how a well formed self-perception can overcome the influences of the context.

Outline

I. Wallace argued that certain aspects of human achievement could not be accounted for within an evolutionary framework. He regarded art, formal thought, and our tendency toward altruism as three aspects of human life which don't match up with the suppositions of evolutionary theory. Altruistic behavior implicitly suggests that mere self-centered survival interests do not ground all significant human action.

II. What exactly is meant by altruism? There is certainly a tendency toward social affiliation evident in all instances of altruism.

III. Scholars have undertaken systematic studies to determine why people do or do not behave altruistically under various circumstances.
   - A. Bystander studies are the most common means by which altruistic behavior is studied.
   - B. The findings from such studies indicate that in situations where the individual is in a group, he or she is most likely to act in the same way that the rest of the group acts.
     1. One reason given by the subjects is that the situation is ambiguous.
     2. The individual momentarily canvasses the situation and determines that nobody is doing anything. He or she may decide to avoid doing what nobody else is doing. This is regarded as the diffusion of responsibility explanation.

IV. The historical question arises, "how was the grave evil of the Holocaust able to take hold in Europe?" One wonders why there was a relatively low degree of altruistic behavior. The diffusion of responsibility is an extremely powerful influence.

V. Aristotle's ethological psychology regards our sociality as a defining characteristic of the kind of creatures we are. This interaction occurs at the level of principle. Thus, it is not necessarily condemnatory when the individual acts in conformity with the action of the group.

Essential Reading:

Henry Gleitman, Chaps. 12, 14

Supplementary Reading:

A. M. Rosenthal, *Thirty-eight Witnesses*. (1964) New York: McGraw Hill.

J. Darley and B. Latané, "Bystander intervention in emergencies: Diffusion of responsibility." 1968, *Journal of Personality and Social Psychology*, vol. 10, pp. 210-214

Questions to Consider:

1. Describe, given the findings of the previous lecture, how altruistic behavior can be explained.
2. Conclude whether, if humans are social creatures, instances of altruism should be more prevalent.

Lecture Forty-Two
Prejudice and Self-Deception

Scope: Regardless of whatever scientific value it might have, the theory of "types" is often part of a folk psychology capable of nurturing bigotry and prejudice. The chief tool of the propagandist is a typology that erases the defining marks of the individual person and absorbs every individual into a general class or collective defined as a certain (racial, ethnic, gender) "type." The propagandist begins by establishing an "us-them" dichotomy, usually resulting in the diminished humanity of the target group.

Research and history both point to the need for participants to reinterpret in a fundamental cognitive way the context that calls for them to behave in ways they would otherwise declare to be unjust and prejudicial. Indeed, they must even reinterpret *themselves*, either by taking on roles of a certain kind or by casting the victims of their actions as somehow deserving of their fate. In Milgram's research, the participants came to reinterpret themselves not in civic or humane terms but as "tools," with "a job to do," serving some other and higher purpose. Although the parallel with death-camp personnel who were "just following orders" might be strained, it is also instructive.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize how prejudice and bigotry are grounded in typological thinking about persons.
2. Describe how misperception and self-deception are central to systematic prejudices, for the facts of the individual case must be distorted or ignored in order to sustain the "type" theory.
3. Explain how propaganda exploits the typological "Folk" psychology.
4. Explain how dehumanizing and blaming the victim are the result of that form of cognitive reinterpretation that "justifies" acts of bigotry and prejudice.

Outline

I. Prejudice simply means reaching a judgment about someone before all of the evidence is in. Prejudice grows out of the general psychological functions that underlie stimulus generalization.

- **A.** Once we get a certain conception of what something is, we can recognize it despite changes in its outward appearance. There is also at work the kind of generalization that was noted by Pavlov. Without these tendencies toward generalization, the world would be utterly unintelligible.
- **B.** Prejudice is an instance of generalization. The application/ construction of typologies is constitutive of prejudice. Such inferences succeed far more frequently than they fail. Thus, the heuristic is employed in a great variety of situations. Prejudice is the extreme misapplication of a process that, when properly managed, is essential to social life.
- **C.** "Outgroup homogeneity" is the social-science term used to describe the tendency to suggest that, "They are all alike."
  1. Prejudice taking this form is at the expense of human individuality itself. Only the group has ontological standing.
  2. The language of propaganda often appeals to this dehumanizing tendency. There is an important difference, however, between dehumanizing and collectivizing.
  3. Studies have shown that sometimes the tendency takes a rather harmless form. In assessing unknown characteristics of individuals, there is always an at least implicit typology. Tendencies of this kind hold up because they are most often successful in practice.
- **D.** The "illusory correlation" is the tendency to take the exception as the rule.

II. Types can be established. Zimbardo's study established prisoner/guard types. Sherif's "Robber's Cave" study demonstrates that the arena of competition establishes typological thinking regarding the competition. Where the competitive framework is removed, the group identification is changed.

- **A.** These practices are at the foundation of important affiliative tendencies among people. There can be no sense of community without such tendencies.

B. Cooperation presupposes the notion of a common cause, which is to recognize others as having aspirations like or unlike one's own.

C. We all, however, are prone to the fundamental attribution error. We attribute the cause for others' misgivings to dispositional factors as opposed to situational factors. Where we succeed, the reason is dispositional. Where we fail, the reason is situational. It is by means of a related concept, the ultimate attribution error, that groups are distinguished on a similar basis.

D. In a related vein, the tendency to blame the victim arises from explanations that are often given to children.

Essential Reading:

Henry Gleitman, Chap. 12

Supplementary Reading:

M. Sherif et al., *Intergroup Conflict and Cooperation*. (1961) Norman: University of Oklahoma Press.

Questions to Consider:

1. Conclude whether prejudices are necessary in order make the complexities of the world manageable.
2. Infer whether prejudices are necessarily laden with normative judgments?

Lecture Forty-Three
On Being Sane in Insane Places

Scope: The title of this lecture is taken from a famous experiment by David Rosenhan who, with colleagues and students, had himself committed to a psychiatric ward and then recorded how all were treated as insane, even though they behaved in a normal way.

The concept of mental illness or psychopathology is not culturally neutral or non-contextual, but instead it reflects the values, expectations, standards, and customs of the judging community. Certain forms of deviance are so destructive as to be seen as pathological in virtually any social context, but many forms of deviation calling for treatment in one culture would be regarded as quite acceptable in another. The basis on which judgments of psychopathology are made is typically that of self-reference: I know I'm O.K. and, if you're significantly different from me, that must mean you're not! Once collectivized, this self-referential standard then becomes authoritative. For many years, the *Diagnostic and Statistical Manual* (DSM) of the American Psychiatric Association listed homosexuality as a mental disturbance calling for psychotherapy. Later versions of the DSM dropped this entry entirely. Neither official position was based on scientific fact. Rather, the attitude of the larger culture toward homosexuality had changed, and the professional attitudes changed accordingly.

Objectives: Upon completion of this lecture, you should be able to:

1. Contrast the concept of mental illness from that of medical disease in that the former is especially dependent on cultural and contextual factors.
2. Summarize how specific studies indicate how clinical judgments are virtually determined by contextual factors, independently of the actual behavior of those being diagnosed.
3. Describe how psychopathology may in some cases be the result of underlying biological or neurological disease, but often may be a label assigned to those whose behavior and perspective simply deviate from the established order of a given culture.

Outline

I. What does one mean by "mental illness"?

- **A.** Prior to answering the question, one must determine exactly who has control of the term.
  1. In this regard, the individual often takes herself to be the standard for determining sanity. What the individual takes to be eccentric indicates what the individual means by mental illness.
  2. The law also establishes one standard for mental illness. What the legal language constitutes as normal dialectically helps the society to define mental illness. One such example is homosexuality.
  3. The culture at large has dispositive power where labels of mental illness are involved.
- **B.** Regardless of the role of culture, there is deference to a kind of expertise. This kind of expertise, however, is quite limited and is far less developed than expertise in physics, etc. In terms of mental illness, expertise refers to expert knowledge of the current corpus of literature, rather than expertise in the mind itself. Nonetheless, credentials have a significant impact on unsuspecting minds.
- **C.** In terms of the medical model, a mental illness is simply the result of a diseased brain. Under this model, the medical community has dispositive labeling power.

II. Rosenhan's research, entitled "On Being Sane in Insane Places," is one of the most cited studies in psychology. He and some of his students got themselves admitted to a psychiatric institution. Once admitted, they would behave just as they had before they were admitted. Interestingly, the diagnosis upon admission was entirely unresponsive to the change in behavior. The initial diagnosis was a kind of immutable typology.

- **A.** Rosenhan's study made quite clear that once an individual is established as a certain type, he or she is treated as that type without regard to obvious changes.
- **B.** Rosenhan suggested that he and his students did not stand out because their "normal" behavior did not stand out.

III. Homosexuality was originally listed in the DSM as a psychopathology. In the most recent DSM, it is no longer listed as a disorder. The removal of homosexuality from the DSM was argued for on the basis that it was extraordinarily refractory to "treatment." The argument went that if it were a bona fide disorder, it would have been treatable. The Dr. Heath experiment at Tulane is an example of the power of labeling and the nature of treatment.

Essential Reading:

Henry Gleitman, Chaps. 17, 18

Supplementary Reading:

David Rosenhan, "On being sane in insane places." 1973. *Science*, vol. 179, pp. 250-58.

Questions to Consider:

1. Conclude whether the detriments of labeling are greater than its assets.
2. Explain what alternatives exist to the institutionalization of the mentally ill and conclude whether those alternatives are more beneficial.

Section Six: Enduring Issues

Lecture Forty-Four
Intelligence

Scope: Advanced societies place a high premium on "intelligence," but psychology has failed to reach consensus on what intelligence is. For decades the term was reserved for those who did well on standardized IQ tests and in their academic studies. But these very measures are notoriously poor predictors of uncommon achievement, and they are notoriously sensitive to cultural and social factors.

In recent years the concept of intelligence has given way to the notion that there are many different forms of intelligent thought and action. These standard and standardized tests are still in use, but are used with reservation and even some suspicion.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain Binet's development of an early intelligence test to distinguish the culturally from the intellectually deficient children in the Paris school.
2. Define the concept of test validity and procedures for determining how well a test predicts real life achievements.
3. Give examples of the typical IQ tests, their strengths and weaknesses.
4. Explain the vast difference between success on tests and success in developing a worthy form of life.

Outline

I. The measurement of IQ had a very humble, but laudable, origin.

- **A.** The closing decades of the nineteenth century in France saw rapid urbanization. Many children from agrarian settings did poorly in school. It was clear that the children were not mentally deficient, but that they lacked the requisite learned resources.
- **B.** Alfred Binet was called in to determine how children could be evaluated. He was a first-rate experimental psychologist.
  1. He began by testing the progress of children thought to be normal, and he wanted to compare the scores of other children against the average.
  2. Binet quickly recognized that his test was saturated with cultural biases. He worked consistently to improve the test to make it relatively more fair across the board.
- **C.** In America, at Stanford University, Binet's test was translated into English and given to U.S. children. In New Jersey, the test was made mandatory; it was thought that an objective test of intelligence could prevent discrimination.
- **D.** In California, many black and Hispanic children were diagnosed as educable but mentally retarded. Larry P. brought a federal suit claiming the test was discriminatory. The judge ruled that the test had to be banned because of the discriminatory consequences.

II. The distinguished German psychologist Stern offered a convenient calculation for making the test score useful. The equation is mental age over chronological age times 100. This metric is known as the IQ score.

III. The task became to make the test match up with the theory.

- **A.** The theory of intelligence is that intelligence is a phenotype which is normally distributed.
- **B.** Normal distribution of test scores does not prove that intelligence is in fact normally distributed. The tests were designed precisely to achieve such a distribution.
- **C.** The question as to whether or not intelligence is normally distributed is an open one.

D. Intelligence is regarded as a fairly stable characteristic of the individual. Thus, an IQ test is considered as reliable when it turns up the same results over time.

E. Validity is the extent to which a test measures what it sets out to measure. An IQ test would be considered valid if it would predict the sort of behavior that is associated with intelligence.

   1. An IQ test should certainly predict academic performance. IQ scores do in fact predict, though not to a moral certainty, measures of scholastic achievement. This should not be a surprise, however, because the test was designed to be a good predictor of scholastic achievement.

   2. Can IQ tests predict Shakespeares or Newtons? Although IQ measures can predict achievements, they do not do nearly as well in predicting exceptionality.

IV. IQ tests can be culturally loaded, but this kind of obvious bias has been removed from the test. Cultural loading includes more than patently evident biases. Parental expectations, etc. all could in principle affect test performance.

Essential Reading:

Henry Gleitman, Chap. 15

Supplementary Reading:

R. J. Sternberg, *Beyond IQ* (1985) London: Cambridge University Press

Questions to Consider:

1. How informative are IQ tests?
2. Explain what might account for the disparity in the average IQs of blacks and whites.

Lecture Forty-Five
Personality Traits and the Problem of Assessment

Scope: There are many tests now in use to assess the "underlying personality" of an individual: so-called "objective" tests such as the MMPI, "projective" tests such as Rorschach's ink blots, Murray's TAT, draw-a-person tests, etc. Such tests are grounded in the notion of dominant types of personality, and they are used to classify persons according to their deviations from some typical or average "type." Thus Smith and Jones are said to be different in the matter of extroversion, shyness, or confidence. The model of research and theory is an individual-difference model according to which the given person is understood chiefly in terms of how he or she differs from an "average" other.

Strong criticisms can be brought to bear on this model and this whole manner of conceiving of persons and "personalities." Knowing about a person calls for something different from knowing that the person is different from someone else! The larger issue has to do with the tension between what has been called the nomothetic and the ideographic approaches to personality. The former seeks to discover general laws describing collectives; e.g., "neurotics" or "extroverts." The latter requires detailed studies of individual persons, individual lives, which nonetheless will reveal certain general features of human beings at large.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize the major tests employed in studies of personality.
2. Explain how such tests are validated.
3. Summarize how such tests are based on an individual-differences model of personality assessment, a model that simply is inapplicable to the actual individual.
4. Illustrate the different rationales behind nomothetic and ideographical approaches to the understanding of personality.

Outline

I. The current age, like previous ages, has various procedures for determining the defining aspects of one's personality. In this regard, we view the claims of others with a certain tameness, especially when the claims are made in the name of science. Nonetheless, various forms of personality assessment are both reliable and valid, at least in one sense. The question of the validity of personality tests is not obvious, since the standard of predictability is not obvious. Ultimately the context of validity is the clinic itself. There are objective and projective tests of personality.

- **A.** Objective tests are objectively scored. The test is composed of numerically codeable items. The Minnesota Multiphasic Personality Inventory (MMPI) is the most frequently used objective tool for personality assessment.
- **B.** The results of projective tests must be interpreted, although a value may be assigned to the interpretation.
  1. The tests are based on the Gestalt principle according to which humans impose a particular order on the world. In many of these tests, the subject is required to provide a narrative order. Thus it is hypothesized that the individual will project her own personality structure on the ambiguous environment.
  2. One of the earliest projective tests was the Rorschach ink blot test. The subject is asked to interpret a number of ink blot cards. From these interpretations, which are scoreable, the examiner can understand the subject's personality structure.
  3. The Thematic Apperception Test (TAT) is another projective test. The subject is shown cards depicting ambiguous situations and is asked to make up a story based on the illustration. The examiner tries to see some degree of thematic integrity across the cards in order to understand the subject's personality characteristics.
  4. Another example of a projective test is the draw-a-person test. This has proven to be effective in providing a partial assessment of children's personalities.

II. The prevailing model in personality psychology is the individual difference model. The individual is compared against the "average" personality in an attempt to better understand the individual.

A. Knowing how two entities differ is fundamentally different than knowing the essential characteristics of each of those entities. This points to the difference between the nomothetic and ideographic approaches to psychological inquiry.

B. Where would saints and heroes be located within these personality scales? It is unlikely that by knowing the average personality, the personality of the saint or hero can be understood.

Essential Reading:

Henry Gleitman, Chap. 16

Supplementary Reading:

J. T. Lamiell, *op. cit.*

Questions to Consider:

1. Infer how accurately responses to projection tests can be coded (given an objective value).
2. Explain to what extent the results of personality tests are valid.

Lecture Forty-Six
Genetic Psychology and "The Bell Curve"

Scope: Intelligence (IQ scores) and personality (personality test scores) are said to display high "heritability." Both attributes tend to be distributed normally in large and random samples, as are height and weight and other "natural" characteristics. Thus the so-called "Bell curve" describes how intelligence and other psychological characteristics are apportioned in the general population. Studies also indicate that the average intelligence of different "races" differs and, therefore, that programs of educational enrichment are, in the words of one expert, "doomed to fail"!

But the concept of "heritability" is subtle. It refers not to some theoretical entity but to actual measurements drawn from actual samples. What the term refers to is not the average characteristic of such samples, but the fraction of the variance within such samples that can be attributed to genetic variation. Accordingly, to know the heritability of, say, IQ is to know nothing about whether or to what degree a program of enrichment might alter its average value. It is important to recognize, then, that traits displaying high heritability are not fatalistic inevitabilities. The relevant question is not, therefore, whether a "trait" is "caused" by "genetics," but the manner in which environmental and genetic factors work together to incline in one direction rather than another.

Objectives: Upon completion of this lecture, you should be able to:

1. Explain what the measure of "heritability" refers to, recognizing that it is not a feature of the individual but of an entire sample of data.
2. Explain how a high heritability does not determine whether or by how much the environment might influence the average value of the trait in question.
3. Summarize how questions regarding how much of a trait are caused by genes and how much by the environment are actually meaningless from a scientific perspective.

Outline

I. The breeding of the guardians in Plato's *Republic* exemplifiees the claim that certain characteristics can be bred into a population. These nativistic theories in psychology are centuries-old. The environment, it is said, can shape the organism only within the context set by genetic boundaries.

II. Most early proponents of intelligence-testing had assumed the genetic superiority of the white race. IQ testing advocates today struggle against the shadow of this tawdry history. The question one must ask is, "Is there something to this talk?"

- **A.** Animal husbandry and agriculture attest to the powerful influence of genetics upon the development of an organism.
- **B.** This does not imply, however, that a psychology attempting to explain the most significant aspects of human existence is significantly informed by genetic talk.
- **C.** There is a field of psychology that seeks to understand the relationship between genetics and behavior.
  1. It is suggested that through genotyping, maze brightness or maze dullness can be achieved.
  2. There is more to the question. Perhaps not "intelligence" but heightened sensitivities and the like have been bred.
- **D.** The heritability of intelligence and its relation to race is a highly controversial issue.
  1. Heritability is a measure of the degree to which variance is attributable to genetic factors. Heritability is equal to V_g/V_t.
  2. However, to know that a characteristic is highly heritable is to know absolutely nothing about the average value of a given distribution. High heritability says nothing about how environmental influence will affect the average value.

3. It has been shown in very large sample studies that there is some basis upon which to compute the heritability of IQ These studies estimate heritability of IQ as between .6 and .9.
4. Moreover, some studies have shown that the average black IQ is lower than the average white IQ.
5. This does not prove that an environmental manipulation will not change the average value. Eye color in fruit flies is functionally 1.0. However, the altitude at which they are reared is determinative of the eye color of a particular fly. It does not follow, as Jensen and Hernstein and Murray argue, that programs like Head Start are doomed to fail.

Essential Reading:

Gleitman, 420-446

Supplementary Reading:

T. Bouchard and M. McGue, "Familial studies of intelligence: A review." *Science*, 1990, 212, pp. 1055-59.

Questions to Consider:

1. Explain what can be learned about individuals from average values.
2. Conclude to what extent genetics can explain the most significant aspects of human life.

Lecture Forty-Seven
Psychological and Biological Determinism

Scope: Behaviorism, psychoanalytic theory, genetic psychology, and the "brain" sciences have been invoked to defend an essentially deterministic theory of human action and human life. If a person's actions have been shaped by a history of reinforcement, set in motion by genetic mechanisms, generated by unconscious motives over which the actor has no control, or caused by discharge-patterns in the brain, then in what sense can the actor be held responsible for his actions? If the brain is the hardware, if the individual genetic code is a central part of the software—modified by learning and memory—then what is left by way of the "person"?

These are questions of deep philosophical and moral consequence. But some aspects of psychological determinism seem to be so self-refuting as to leave ample room for the more traditional view according to which significant actions may be inclined but surely not rigidly determined.

Objectives: Upon completion of this lecture, you should be able to:

1. Summarize how strong versions of behaviorism, psychoanalytic theory, and genetic psychology are deterministic.
2. Identify the essential claims of "determinism" and "volitionalism."
3. Explain why determinism is understood to be counter-intuitive.
4. Describe why determinism, in some respects, is also seen to be self-refuting.

Outline

I. At the foundation of behaviorism, psychoanalytic theory, and genetic psychologies is a similar deterministic philosophical outlook.

A. What does determinism entail? When we talk about the laws of science, we do not refer to a cause, but to a rule by which a cause operates. There is no answer to the question of why the observed relationship obtains.

B. This raises another question about how humans can arrive at a notion of a deterministic causality.

1. David Hume argued that we form ideas of causation when two events are constantly conjoined. We conclude that A is the cause of B, because whenever A appears, B appears. Hume thought that regularity inclines us to draw these conclusions, so that anything can be the cause of anything else.
2. This is an inadequate account of how we come to understand causes. Hume's contemporary critic, Thomas Reid, argued that only because we have an internal, psychological notion of causal powers can we make causal ascriptions. Constant conjunction is neither necessary nor sufficient for establishing a causal relation.

II. There cannot be a moral realm within a deterministic framework. Moral attributions are unintelligible with regard to inevitable actions.

A. A determinism in the metaphysical sense asserts that, given the prevailing conditions, whatever happens in the universe could not be otherwise.

B. With regard to human action, hard determinism would suggest that given the reinforcement history or the genetic endowment, the individual could not do other than she did.

C. The compatibalist thesis suggests that, in some way, the deterministic thesis is compatible with volitionalism.

III. What is the nature of the deterministic thesis? Is it a scientific thesis or simply the most sensible of competing alternatives?

A. If determinism is a scientific thesis, some conceivable experiment could confirm or refute it. Such an experiment must be able to distinguish authentic motives and external forces. This is, in principle, an

inconceivable experiment. Either it is no experiment if Smith's answers are determined, or if there is a true test, the thesis is false.

B. If determinism were true, everything in the universe would be the way it is. A radical determinism leaves everything as it was before the thesis was accepted.

Essential Reading:

Daniel N. Robinson, Chaps. 10-12

Supplementary Reading:

D.N. Robinson, *Philosophy of Psychology*, Ch. 1

Questions to Consider:

1. Explain, if human actions aren't determined, whether psychology can be a science.
2. Infer whether there are softer formulations of determinism that could avoid some of the above criticism.

Lecture Forty-Eight

Civic Development: Psychology, the Person, and the Polis

Scope: Aristotle provided the first and, in important respects, the fullest and most systematic theory of psychology. He recognized that the individual person is shaped by biological, social, cultural, and political influences, all working in an integrated way to form a given character. He also recognized that the person participates knowingly and willfully in this process.

A central feature of Aristotle's psychology is the notion that only one general form of life is right for a rational creature, and that the failure to enter into that form of life makes true happiness unattainable. The form of life is at once social, political (in the broad sense), and "perfectionist," this last term referring to a life-long striving to improve oneself in essentially moral ways.

The questions arising from this Aristotelian perspective are numerous and vexing. Is there really only one general form of life that is right for human beings? Can one have the right form of life under the wrong political regime? Is the state to be a moral teacher and, if so, what is that fate of freedom within such a state?

Objectives: Upon completion of this lecture, you should be able to:

1. Evaluate Aristotle's systematic and broad theory of human nature and recognize the relatively narrow systems of psychology now on offer.
2. Describe how "character" and the satisfactions with life that one may come to have are inextricably bound up with social, political, and cultural influences of the most powerful and formative nature.
3. Explain how human development is not only inevitably within a context, but that successful development requires one to shape the very contexts known to shape one's character. Thus one strives to bring about a form of governance known to influence one in the right way.

Outline

I. Aristotle's psychological writings are perhaps the most systematic theory of psychology ever offered. Aristotle's theory addresses the biological, the political, the ethological, and the religious aspects of human life, and it formulates a comprehensive theory of human nature.

- **A.** Aristotle had a voracious appetite for information. He did very little "armchair" theorizing. He was a scientist, psychologist, and philosopher who consistently qualified his conclusions based on his observations.
- **B.** From his ethological perspective, Aristotle suggests that species are shaped by their environment. Similarly, he stresses the rearing of young members of the species. For humans, the political community (polis) has a primary role in this regard.
- **C.** Aristotle says that the polis precedes the family and the person.
  1. The notion of family is to be understood in more than one sense. Family is not to be understood in biological terms, but in terms of a particular form of social organization. Absent the customary laws and precepts of the polis, familial attributes such as duties and the like could not come into being.
  2. The person, in the sense of personal identity, requires an ineliminably political/social context.

II. Aristotle defines the nature of psychic processes uniquely found in humans as the ability to frame universal propositions. It is precisely this faculty which allows humans to live within a rule of law. This makes the polis itself possible.

III. When tamed by law, humans are the very best of animals, but when unrestrained by law, humans are the worst of animals. Life outside the polis does not fulfill the very terms of our humanity. Humans can only realize virtue and flourish within the proper culture. If the community is lawless and deplorable, so too will be its citizens. This defining characteristic of humans establishes our defining task.

Supplementary Reading:

A. Kenny, *Aristotle on the Perfect Life*. (1990) Oxford: Oxford University Press.

D.N. Robinson, *Aristotle's Psychology* (1989) New York: Columbia University Press

Questions to Consider:

1. Explain whether, under an Aristotelian scheme, there are individual rights.
2. Explain what should be the goal of psychology.

Biographical Notes

B. C.

c.a.750 ....**Homer**: The blind poet who composed *Iliad* and *Odyssey,* in which the conditions influencing human thought, feeling, and action are developed.

469?-399.............**Socrates**: The father of that branch of philosophy that is concerned with the human condition, in contrast to the nature of the cosmos and the physical world. His teachings are developed systematically by his greatest student, Plato, in a collection of dialogues.

460?-377?...........**Hippocrates**: The father of Greek medicine whose students, the Hippocratics, practiced a holistic medicine that included dietary, aesthetic, and surgical forms of treatment.

427?-347.............**Plato**: The founder of the Academy in Athens, the first great school of philosophical studies, and the author of more than a score of dialogues that would set the agenda for much subsequent philosophical inquiry.

385-322...............**Aristotle**: The first systematic philosophical psychologist whose writings sought to integrate the biological, psychological, social, and political dimensions of life and to offer a developed theory of personality development as a function of these various influences. His school, the Lyceum, featured an extensive curriculum that included the natural sciences, politics, psychology, and ethics.

372?-287.............**Theophrastus**: Succeeded Aristotle as director of the Lyceum, where he organized the studies for more than three decades. His treatise on *The Moral Characters* is an early "type" theory of personality.

A.D.

130-200...............**Galen**: One of the earliest experimental biologists of the post-classical period. He practiced vivisection on a variety of animals, including pigs whose vocalizations he was able to eliminate by sectioning the recurrent lingual nerve, thus locating vocalization in the brain. His psychobiological theory of the "humours" was influential for centuries.

1515-88...............**Weyer**: Johann Weyer's treatise on witchcraft, *De Prestigiis Daemonum* (1579) was among the first to connect "witchery" to mental disturbances, chiefly melancholy.

1561-1626...........**Bacon**: Francis Bacon's *The Proficience and Advancement of Learning* (1605) signaled the rise of the modern scientific perspective. His *Novum Organum* (1620), the second part of his *Great Instauration*, would serve as something of a bible for the experimentally and scientifically inclined writers of the seventeenth and eighteenth centuries.

1564-1642...........**Galileo**: His astronomical observations and experiments in mechanics supported his writings in the philosophy of science, which proved to be authoritative in overthrowing much of the "old wisdom." His classic *Dialogues Concerning Two New Sciences* (1638) summarizes thirty years of research and the theories supported by it.

1596-1650...........**Descartes**: His research and writing did much to advance biological psychology, chiefly through the concept of reflex mechanisms and the general theory according to which many sensory and motor functions could be explained mechanically. He also defended a form of dualism that denied that the rational operations of the mind were causally brought about by material or biological processes. His *Treatise of Man* (1662) appeared posthumously and is the most "materialistic" of his psychological writings.

1642-1727...........**Newton**: Isaac Newton's *Principia* (1687) established the "rules" for scientific experimentation and theorizing that would be taken as authoritative thereafter.

1632-1704...........**Locke**: John Locke, a friend and great admirer of Newton's, set out in his *An Essay on Human Understanding* to develop something of a Newtonian theory of mind, and a Newtonian approach to the study of mental life in which basic sensations form simple and then more complex ideas by an associational process akin to gravitation.

1748-1832...........**Bentham**: Jeremy Bentham's *Principles of Morals and Legislation* (1789) tied all significant human and animal activity to considerations of pleasure and pain and all morality to considerations of utility.

1758-1828...........**Gall**: Franz Joseph Gall was the father of phrenology and one of the great neuroanatomists of the eighteenth century. His research and writings strongly supported the neurological perspective on psychology. His *Investigations on the Nervous System in General and on that of the Brain in Particular* (1809) was a multivolume contribution that was widely read and translated.

1795-1878...........**Weber**: E.H. Weber, the Leipzig physiologist, carefully studied the sense of touch and the ability of observers to discriminate weights of different magnitude. From these studies he was able to frame the first general law of sensory function, *Weber's Law*, which he published in 1835.

1801-87...............**Fechner**: Gustav Fechner's *Elemente der Psychophysik* (1860) established the experimental methods and overall perspective for research on sensation and perception. The work also includes his derivation of Fechner's Law.

1806-73...............**Mill**: John Stuart Mill did much to advance both empirical psychology and the experimental methods of inquiry. His *A System of Logic* (1843) defended the scientific and experimental approach to "human nature."

1808-82...............**Darwin**: Charles Darwin's *Origin of Species* (1859) and his *Descent of Man* (1871) put an essentially evolutionary psychology on the map of thought and gave impetus to the fields of comparative psychology and developmental psychology.

1817-68...............**Griesinger**: His *Mental Pathology and Therapeutics* (1845) begins with the claim that mental disease is grounded in disease processes in the brain.

1821-94...............**Helmholtz**: The premier scientist of the German-speaking world at mid-century, Helmholtz would advance significant theories on the physiology of auditory and visual functions. The original of his *Treatise on Physiological Optics* appeared in German in successive volumes between 1856 and 1866.

1824-80...............**Broca**: Pierre Broca identified and in 1861 reported the region of the brain which, when destroyed by a lesion, resulted in the patient's inability to speak; so-called Broca's aphasia.

1832-1920...........**Wundt**: The father of experimental psychology, Wilhelm Wundt founded the first university laboratory devoted to the subject in 1879 at the University of Leipzig.

1834-1918...........**Maudsley**: In his *The Physiology and Pathology of the Mind* (1867), Henry Maudsley provided robust clinical data and strong arguments in support of the medical model of mental illness.

1848-1905...........**Wernicke**: Carl Wernicke's clinical observations located the region of the brain which, when diseased, permitted the patient to speak coherently but not to comprehend the spoken word; Wernicke's syndrome.

1842-1910...........**James**: Perhaps the greatest of all psychologists, William James brought an irresistible literary style and great analytical and critical power to bear on the larger as well as the smaller issues in psychology. His *Principles of Psychology* (1890) is still the best systematic introduction to the subject.

1849-1936...........**Pavlov**: The discovery of the "conditioned reflex" and the general theory accounting for it are credited to Ivan Pavlov, who relentlessly advocated a purely biological approach to the issues traditionally regarded as "psychological." He advanced an outline of his position in his Nobel Prize address of 1905.

1850-1909...........**Ebbinghaus**: Hermann Ebbinghaus's *On Memory* (1885) was a pioneering work in the field of memory research.

1856-1939...........**Freud**: The father of psychoanalysis and the most influential psychologist of the twentieth century. With Breuer he published *Studies of Hysteria* in 1896, a prelude to the future theory of hysteria as the outcome of repression.

1857-1911...........**Binet**: Alfred Binet and Theodore Simon published *The Development of Intelligence in Children* in 1905 and helped launch the mental-testing movement.

1874-1939...........**Thorndike**: E.L. Thorndike's *Animal Intelligence* (1898) offered the first published records of the time-course of animal learning and presented the model of "instrumental conditioning" that would be the model of later behaviorist research.

1875-1961...........**Jung**: In his *Psychological Types* (1920) Carl Gustav Jung departs further from the traditional Freudian theory and develops the theory of the introverted and extroverted "types."

1878-1958...........**Watson**: The father of "American Behaviorism," John B. Watson opposed the mentalistic psychologies of his day and advocated as the proper subject of psychological investigation the actual observable behavior of human and nonhuman animals. His famous defense of this position appeared in his article in *Psychological Review* in 1913, "Psychology as the behaviorist views it."

1886-1961...........**Tolman**: E.C. Tolman's *Cognitive Maps in Rats and Man* (1948) summarized numerous and ingenious studies establishing the essentially cognitive nature of problem-solving.

1887-1967...........**Köhler**: One of the fathers of Gestalt psychology, Wolfgang Köhler published his seminal work on *Gestalt Problems and the Beginnings of Gestalt Theory* in 1925.

1890-1958...........**Lashley**: In *Brain Mechanisms in Intelligence* (1929), Karl Lashley offered an early installment of an illustrious career devoted to the study of central mechanisms in learning and problem-solving.

1896-1974...........**Piaget**: Jean Piaget's *The Child's Representation of the World* appeared in 1926 in French, but his influence was much later in the English-speaking world.

1904-88...............**Skinner**: B.F. Skinner's *Behavior of Organisms* appeared in 1938 and was followed by texts and articles establishing him as the major figure in the history of behaviorism.

Glossary

Absolute threshold: The minimum amount of stimulation sufficient to be experienced

Agnosia: The failure to comprehend the meaning or function of things otherwise correctly and accurately perceived.

Anthropomorphism: A form of explanation of non-human attributes in terms of allegedly comparable human attributes. Thus, the formation of ants approaching another colony is explained as an "army" ready to engage in "war."

Aphasia: Either expressive (as in Broca's aphasia) or receptive, the inability to use language.

Apraxia: The inability to perform stereotypical but complex movements such as putting on a jacket.

Anal stage: The second of Freud's stages of psychosexual development; the stage at which bowel functions are associated with sensual gratification.

AI: The acronym for "artificial intelligence."

Artificial intelligence: A form of "intelligent" or problem-solving performance achieved by a programmed computational device.

Basilar membrane: A membrane in the inner ear's cochlear duct along the length of which are the auditory receptor ("hair") cells.

Behaviorism: The theory or perspective according to which observable behavior is the exhaustive subject matter of a scientific psychology.

Biofeedback: The technique for making available to the observer information regarding his or her own physiological states and events; e.g., a visual display of one's own blood pressure or heart rate or skin resistance.

Bipolar: The form of manic-depressive illness in which episodes of both mania and depression occur, as distinct from *unipolar*.

Broca's Aphasia: An expressive aphasia resulting from a lesion in Broca's area, the third frontal convolution in the left hemisphere.

CAT scan: CAT is the acronym for computerized axial tomography; a radiographic technique for constructing three-dimensional anatomical pictures.

Catharsis: In psychoanalytic theory, the release (Gk. *catharsis*) of blocked psychic energy, typically by way of free-association and sustained talk.

Cognitive maps: Tolman's term for the apparent mental or cognitive representation of the external world, such that the rat is able to frame alternative courses of action to reach a desired goal.

Cones: In vision, the retinal receptor cells whose activation takes place in dim and brighter light, though not in darkness; cells that mediate the experience of color.

Conservation:

(a) In psychoanalytic theory, the principle according to which psychic energy in the system is "conserved," though it might express itself in a variety of ways; e.g., it might be expressed in the form of physical symptoms.

(b) In Piaget's theory of cognitive development, a principle that is understood only by older children; the principle according to which, e.g. the quantity of a thing is not changed when it is given a different shape.

Constancy (perceptual): The tendency to see known objects as retaining their known size and shape even as they are moved to more distant locations or are differently oriented; e.g., a saucer seen as round even when presented horizontally.

Conversion reaction: In psychoanalytic theory, the explanation of hysterical symptoms as the result of a conversion of psychic to physical processes.

Depth psychology: Psychological theories based on the concept of the unconscious, otherwise inaccessible at the superficial levels of perception and introspection.

Difference threshold: The minimum difference between two stimuli sufficient for the observer to distinguish between them.

Duplex theory: The theory (fact) that vision is mediated by two functionally different types of receptors, rods and cones; the former activated at the lowest levels of illumination but unable to mediate the experience of color; the latter activated at higher levels of light intensity and associated with the perception of color.

Eudaimonia: In Aristotle's theory that form of "happiness" or "flourishing" that might be achieved by one whose overall form of life is rationally ordered and virtuous.

Ego: The "self" or "I" in psychoanalytic theory, fashioned out of the competing forces of the instinctual and the social.

Empiricism: That philosophical perspective according to which knowledge is grounded in experience, and experience is the ultimate standard of all knowledge claims. It may be contrasted with both rationalism and nativism.

Expert systems: A branch of engineering that seeks to identify the attributes of human expertise (e.g., medical diagnosis) and incorporate them into complex computational programs.

Extrovert: According to Carl Jung, the two dominant personality tendencies are toward extroversion or introversion, each of these forming a "type" of personality which, when known to the psychoanalyst, permits predictions in a wide range of circumstances.

Functionalism: A quite general perspective on biology and psychology according to which various processes or attributes are understood in terms of the functions served by them. Thus, the right question to ask about, e.g., "consciousness," is not what it is, but what it is *for*; what can be achieved by the organism possessing it which cannot otherwise be achieved.

Frontal lobe syndrome: A set of cognitive defects, often involving disrupted perceptions of events taking place over a stretch of time.

Genital stage: The final stage of psychosexual development in which sexual gratification is achieved through heterosexual intercourse.

Glove Anesthesia: A classic form of hysterical symptom in which sensitivity is diminished or lost over the region of the hand that would be covered by a glove, this not being possible as a result of actual nerve damage.

Heritability: The fraction of the total variance displayed by a characteristic that is attributable to genetic sources of variation.

Hermeneutics: Originally reserved to the field of biblical or scriptural interpretation, now used more generally to refer to explanation as a form of interpretation.

Heuristic: A device or scheme that aids in the diagnosis and solution of problems.

Hypnosis: The means or practice by which cooperative subjects can be placed in a state of semiconsciousness or unconsciousness but can still be "reached" in such a way as to alter their perceptions and actions.

Hysteria: Initially, an assortment of temperamental, perceptual, and behavioral abnormalities thought to be associated with childbirth and other gender-specific conditions; hence the word, which is a version of the ancient Greek for *uterus*; later referring indifferently to men and women displaying such perceptual, behavioral and emotional disturbances.

Id: In Freud's theory, the basic, instinctual core of drives inherited as part of the animal ancestry of the human race; tendencies toward self-gratification and self-preservation without the regulative influences of civilization.

Instinct: A typically complex pattern of behavior (i.e., unlike reflexes) exhibited (nearly) universally within a species or by one gender in that species, and appearing in essentially complete form without the benefit of practice or training.

Instrumental conditioning: The term used to designate conditioned behavior that is instrumental in problem-solving or in reaching a goal; as distinct from reflexes.

IQ: The "intelligence quotient" calculated by dividing mental age by chronological age and multiplying by 100. A 10-year old who scores at the mental level of the average 12-year old has an IQ of 120 (12/10 X 100).

Lateralization: The tendency of certain perceptual or behavioral capacities to be localized in one but not both halves of e.g., the cerebral cortex. Thus, lesion in the left hemisphere leads to paralysis on the right side of the body, etc.

Law of effect: Thorndike's law, stating that behavior is strengthened or weakened by the effects it produces; behavior leading to a "pleasing state of affairs" thus becoming more likely; that leading to pain or punishment, less likely.

Limbic system: In highly integrated collection of structures below the cerebral cortex and having strong associations with basic emotional patterns of behavior such as copulation, aggression, maternal activity, etc. The structures include the amygdala, the septum, the Isle of Rile, the hippocampus and the columns of the fornix.

Machine functionalism: A concept in contemporary philosophy of mind that would equate intelligence or cognition not with a specific anatomy (e.g., the brain) or type of animal (e.g., human) but with any generic device able to perform intelligent or cognitive functions.

***Malleus Maleficarum*:** "The hammer of evils" was *the* book in the fifteenth century that informed courts on the procedures for identifying witches and the punishments to be imposed on them. Written by two Dominicans (Sprenger and Kramer) it offered a perilous mixture of science, pseudo-science, and rank superstition.

Manic-depressive: A form of psychosis; a severe mental illness in which the sufferer experiences delusions and is overcome by episodes of uncontrollable and even suicidal depression and/or destructive forms of mania.

Materialism: That philosophical school or system that takes the ultimate reality to be a material reality, finally lacking in any other kind of "stuff"—notably "mental" stuff.

Mnemonic: A technique for aiding memory.

Nativism: A psychological orientation or theory according to which certain mental or cognitive powers are innate, requiring only time for maturation before expressing themselves in their full form.

Neo-Freudian: The member of a psychoanalytic school or system indebted to Freudian theory but departing from it to a greater or lesser extent.

Noise: A technical term referring to any event or entity that interferes with the detection of a target-stimulus.

Nomological-deductive model: Developed and defended by Carl Hempel, a model of scientific explanation based on the proposition that an event has been explained scientifically when it is shown to be deducible from a general law (Gk. *nomos* = law)

Nonsense syllables: Used by Hermann Ebbinghaus in his pioneering studies of associative memory processes. Typically, such syllables are formed by a consonant-vowel-consonant sequence such as MIB, TUJ, etc.

Ontology: The branch of metaphysics addressed to questions regarding real or actual being. Whether or not there are actually existing minds or consciousness or thoughts (as distinct from matter) is an *ontological* question.

Operant: Skinner's technical term for an observable musculo-skeletal movement.

Oral stage: The first stage in Freud's theory of psychosexual development; the stage at which sensual gratification is achieved by oral stimulation, such as sucking.

Ossicles: The three bones of the middle ear which translate motion from the ear drum to the cochlear duct of the inner ear.

Payoff matrix: In general, the costs and benefits of various decisions and decision-strategies; in signal detection theory, the costs assessed against either false alarms or missed targets.

Phallic stage: The stage of psychosexual development when sexual gratification is achieved through genital self-stimulation.

PET scan: The acronym stands for *positron emission tomography*. Radioactively tagged elements are introduced into the blood supply to the brain so that the rate of oxidation in various regions can be monitored in real time, thus providing a record of activity in specific regions.

Pitch: The auditory sensation associated with the frequency of sound.

Physiognomy: The pseudo-science of Lavater, which promised to reveal basic personality and moral characteristics by the close study of facial types.

Pleasure principle: Freud's term for the controlling influence that modes of sexual gratification have on behavior; a principle grounded in the ancestral and instinctual animal pleasures and tied to survival and procreation.

Positivism: A philosophical defense of scientific modes of inquiry as the only source of valid knowledge. The "positive" knowledge of science is contrasted with superstition, religious faith, and untestable intuition.

Psychosexual development: Freud's conception of the maturation of sexuality from the nourishment-based instincts of infancy to adult procreative sexuality; a maturation in which basic instinctual inclinations are "socialized" by the adult community.

Rationalism: A term used somewhat imprecisely to cover various philosophical positions and systems that may have little in common; but generally covering philosophical arguments to the effect that all valid knowledge must be in the form of rationally intelligible and integrated ideas rather than the disjointed facts of bare experience.

Reality principle: As used by Freud, a concept covering the socialization and civilizing of those impulses grounded in the Pleasure Principle.

Receptors: Specialized cells that respond selectively to particular classes of physical or chemical stimuli. The rods and cones of the retina and the hair cells of the inner ear are examples.

Repression: In psychoanalytic theory, the mechanism or process by which unacceptable thoughts and desires are kept out of consciousness and are driven (repressed) into the recesses of the unconscious.

ROC curve: The acronym stands for *receiver operating characteristics* and refers to the performance of a detection system. The curve is a plot of the rate of false alarms against the rate of "hits."

Rods: Receptor cells in the retina, sensitive to the lowest levels of visible illumination but not associated with the color-sensing mechanisms of the visual system.

Schizophrenia: A form of psychosis characterized by hallucinations, delusions, and thought so disordered as to prevent a rational form of life.

Span of apprehension: The maximum number of items that can be kept in immediate memory after a brief exposure. In the absence of special "priming" techniques, this number is on the order of 7 or 8.

Split brain: A term referring to the surgical disruption of pathways that join the two halves of the brain.

Structuralism: In the modern history of psychology, this term was used to describe that program of research and theory devoted to unearthing the structure of mental life; the sensations, images, feelings, and interactions among these giving rise to mental life.

Superego: In psychoanalytic theory, the equivalent of "conscience."

Teleological: An explanation of an event or thing based on the purpose or goal (Gk. = *telos*) achieved as a result of that event or thing. The long neck of the giraffe is teleologically explained when the attribute is connected to the nutritional requirements of the species and the altitude of needed vegetation.

Unconscious: As distinct from non-conscious or the medical sense of "unconscious", the psychoanalytic concept of a dynamic realm of motives and conflicts, outside the reach of consciousness, but shaping conscious behavior.

Unipolar: The form of manic-depressive illness in which mood swings are generally absent and the patient is either in one or the other phase of the disorder. Depression is the more common form of unipolar manic-depressive disease.

Timeline

B.C.

ca.750..................Homer's *Iliad* and *Odyssey*

399..................Socrates chooses death over dishonor

400..................Hippocrates flourishes

367..................Plato founds the Academy

335..................Aristotle founds the Lyceum

322..................Theophrastus succeeds Aristotle as director of the Lyceum

A.D.

180................Galen undertakes research on the nerves in relation to behavior

1579 ....Johann Weyer's *De Prestigiis Daemonum* published

1605................Francis Bacon's *The Proficience and Advancement of Learning*

1609................Galileo observes the moons of Jupiter

1644................Descartes's *Principles of Philosophy*

1687................Isaac Newton's *Principia*

1690................John Locke's *An Essay on Human Understanding*

1789................Jeremy Bentham's *Principles of Morals and Legislation*

1809 ....Franz Joseph Gall's *Investigations on the Nervous System in General and on that of the Brain in Particular*

1835................Weber's Law

1843................John Stuart Mill's *A System of Logic*

1845................Griesinger's *Mental Pathology and Therapeutics*

1856................The first volume of Helmholtz's *Treatise on Physiological Optics*

1859................Darwin's *Origin of Species*

1860................Fechner's Law

1861................Pierre Broca identifies "Broca's area"

1867................Henry Maudsley's *The Physiology and Pathology of the Mind*

1879................Wundt establishes the psychology laboratory at Leipzig

1885................Ebbinghaus's *On Memory*

1890................William James's *Principles of Psychology*

1896................Freud and Breuer publish their *Studies of Hysteria*

1898................E.L. Thorndike's *Animal Intelligence*

1900................Freud's *The Interpretation of Dreams*

1905................Ivan Pavlov gives Nobel Prize address

1905................Alfred Binet and Theodore Simon publish *The Development of Intelligence in Children*

1913................John Watson's "Psychology as the behaviorist views it"

1920 ....Carl Jung's *Psychological Types*

1925……………Wolfgang Köhler's *Gestalt Problems and the Beginnings of Gestalt Theory*

1926……………..Jean Piaget's *The Child's Representation of the World*

1929 ……………Karl Lashley's *Brain Mechanisms in Intelligence*

1932……………E. C. Tolman's *Purposive Behavior in Animals and Men*

1938……………B. F. Skinner's *Behavior of Organisms*

1948……………E. C. Tolman's *Cognitive Maps in Rats and Man*

1954……………James Olds publishes *Studies of Reward and Punishment Centers in the Brain*

1956……………Solomon Asch's "Studies of independence and conformity"

1959……………Noam Chomsky reviews Skinner's *Verbal Behavior*

1963……………Lawrence Kohlberg's "Development of children's orientations toward a moral order"

1963……………Stanley Milgram, "Behavioral study of obedience"

1972……………Jean Piaget's *The Child's Conception of the World*

1973……………David Rosenhan's "On being sane in insane places"

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Lockheart, R. and Craik, F. "Levels of processing: A retrospective commentary on a framework for memory research." 1990, *Canadian Journal of Psychology*, vol. 44, 87-122. (Beyond the memory "trace," this monograph summarizes the most important work on memory "priming" and related cognitive aspects of memory.)

Loftus, E. *Eyewitness Testimony* (1989) Cambridge: Harvard University Press (The leading researcher summarizes the factors that lead to misidentification and false alarms.)

Mather, C. *On Witchcraft*. (1662/1991) New York: Dorset (Cotton Mather's confident theory and relentless assaults on those who would be different.)

Milgram, S. *Obedience to Authority*. (1974) New York: Harper & Row (The famous studies of obedience are discussed by the man who made them famous.)

Mischel, W. *Introduction to Personality*, 4th ed. (1986) New York: Holt, Rhinehart and Winston. (A standard text in the field, rich in detail and explanation.)

Moody, T. *Philosophy and Artificial Intelligence* (1995) New Jersey: Prentice Hall. (The main claims of the AI community are summarized, as is the criticism advanced against these; up-to-date and clear.)

Neisser, U. *Memory Observed*. (1982) San Francisco: Freeman (Memory in the real world, beyond the laboratory and its controls.)

Newton, I. *Philosophiae Naturalis Pricipia: I. The method of natural philosophy*. In *Newton's Philosophy of Nature*. (1953) H. S. Thayer, ed. New York: Haffner. (One of the greatest achievements of the scientific mind.)

Pavlov, I.P. *Conditioned Reflexes*, G.V. Anrep, trans. (1927) New York: Oxford University Press. (Presents Pavlov's research and theoretical writings and reveals the unwavering physical perspective of the father of classical conditioning.)

Penfield, W. *The Mystery of the Mind* (1975) Princeton: Princeton University Press (The greatest neurosurgeon of the 20th century discusses the implications of a lifetime of probing the recesses of the human brain in patients able to reflect "on-line"!)

Piaget, J. *The Language and Thought of the Child*. (1955) New York: Meridian Books (A good introduction to Piaget's approach and perspective, with useful discussions of the famous stages.)

Plato, *The Dialogues,* Benjamin Jowett, Trans. New York: Random House, 1953 (All philosophy, said Whitehead, is "a footnote to Plato.")

Posner, M. and Petersen, S. "The attentional system of the human brain." 1990, *Annual Review of Neuroscience*, vol. 13, pp. 25-42. (Attention is explicated here in terms of basic neurophysiological processes; reviews of major research are offered as well as suggestive theories of attentional processes.)

Restak, R. *The Brain*. (1988) New York: Bantham (A good general introduction to "the brain sciences," based on the PBS series on *The Brain.*)

Robinson, D. *Aristotle's Psychology*. (1989) New York: Columbia University Press. (A review and interpretation of the systematic psychology developed by Aristotle across a range of his treatises.)

Robinson, D. *Philosophy of Psychology*. (1985) New York: Columbia University Press. (An examination of modern perspectives and approaches to definition and explanation in psychology.)

Robinson, D. *Wild Beasts and Idle Humours: The Insanity Defense from Antiquity to the Present*. (1996) Cambridge: Harvard University Press. (How the law has understood mental life from the time of Homer.)

Robinson, D. ed. *Social Discourse and Moral Judgment*. (1989) San Diego, California: Academic Press (Essays by leading psychologists and moralists on the nature of morality and the conditions under which it is exercised and understood.)

Robinson, D. *An Intellectual History of Psychology* (3d ed.) Madison: University of Wisconsin Press, 1995. (A survey of psychological thought drawn from Western intellectual history.)

Rosenhan, D. "On being sane in insane places." 1973 *Science*, vol. 179, pp. 250-58. (Once committed, Rosenhan and his colleagues were treated as mental patients, no matter how they behaved!)

Rosenthal, A.M. *Thirty-eight Witnesses*. (1964) New York: McGraw Hill. (Kitty Genovese was left without help by thirty-eight eyewitnesses as her assailant proceeded to kill her.)

Rock, I. *An Introduction to Perception* (1975) New York: Macmillan (A good treatment of the subject; not so technical as to require prior study.)

Sherif, M. et al., *Intergroup Conflict and Cooperation*. (1961) Norman: University of Oklahoma Press. (The Robbers' Cave experiments and their implications.)

Skinner, B.F. *Science and Human Behavior*. (1953) New York: Macmillan (A classic statement of the modern behavioristic perspective by the man who fashioned it.)

Skinner, B.F. "Can psychology be a science of the mind?" 1990, *American Psychologist*, vol. 45, pp. 1206-10. (The "mind," as redone by the leader of behavioristic psychology.)

Skinner, B.F. *Beyond Freedom and Dignity*. (1971) New York: Knopf (The world as it should be, according to B.F. Skinner; NO PRAISE—NO BLAME!)

Segall, M. et al. *The Influence of Culture on Visual Perception*. (1966) New York: Bobbs Merrill (The "carpentered world" of the West yields perceptual tendencies different from those found in less structured places.)

Shepherd, R. *Mind Sights*. (1990) New York: Freeman (Mental rotation and other rich cognitive events are discussed with insight and suggestively.)

Sternberg, R. *Beyond I.Q.* (1985) London: Cambridge University Press. (Sternberg's "triarchic" theory of intelligence and his stern criticism of the conventional view of intelligence.)

Tolman, E.C. "Cognitive maps in rats and man." 1948, *Psychological Review*, vol. 55, pp. 189-208. (Rats know more than they reveal—until the research gives them a chance to show it!)

Tulving, E. and W. Donaldson, eds. *Organization of Memory*. (1972) New York: Academic Press (An excellent introduction to the manner in which memory is studied and understood in the post-associationistic period.)

Watson, J.B. *Psychology from the Standpoint of a Behaviorist*. (1919) Philadelphia: Lippincot (THE statement!)

Wolpe, J. *The Practice of Behavior Therapy*. (1973) New York: Pargamon (The behavioristic approach to defining and treating "neurotic" disorders; Freudians need not apply.)

